

Comparing Methods for Involving Users in Ideation

The Use of Future Workshops and Blogs in Library Innovation

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A1: Public, private and social innovation in manual services

Chair: Britta Hermelin

A2: Manual service systematization and service values

Chair: Flemming Sørensen

Service culture and value experiences of everyday service: North-South divide

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³University College Cork, Ireland

The purpose of our study is to analyse individual service culture and value experiences of everyday services. Specifically, we understand service culture as the collective cultural dimension of individual service experiences. We focus on regional service cultures in Northern and Southern Europe and draw on Consumer Culture Theory (CCT) in order to understand how individuals make sense of their service experiences, meaning of resources and resulting value experiences within a collective cultural frame that affects their value experiences. We argue that service culture creates a foundation for current service and value experiences, expected service and value experiences, and imaginary ideal service and value experiences. We therefore contribute to service research in experiential value by extending service researchers' focus beyond individual service experiences to collective service experiences of service culture that creates a foundation for current and expected service and value experiences.

1. Introduction

The study of culture has been an important topic across a number of business domains. For example, in organizational studies, culture is defined as “a set of values, beliefs, and norms that direct the thinking and decision making of a group” (Leininger and McFarland 2006). On the management side, this simplistic approach to culture in service experiences has been questioned due to increasing emphasis on the service economy (Pine and Gilmore 1998).

In the service research, culture has been dealt with both within the international service management literature and service research more generally. In particular the exploration of the service culture has interested researchers in the context of the internationalization of services (e.g. De Ruyter et al., 1998; Hyder et al., 2009), the role of culture of service organisations (e.g. Wilson, 1995, Webster and White, 2010; Akiko. 2012.), the impact of culture on service quality and recovery (e.g. Laroche et al., 2004; Ladhari et al., 2011; Wan, 2013). With some exceptions (e.g. Chan et al., 2012), the main corpus of service research seems to focus more on the perspective of provider service organisation, while less is said on consumers and how he/she makes sense of his/her service and value experiences within a collective cultural frame.

The more recent elaboration of Service-Dominant logic (SDL) (Vargo and Lusch, 2008) has greatly illuminated on consumer participation in value and service process. SDL scholars have argued for understanding value as exclusively, located within the phenomenological experience of beneficiary (Vargo and Lusch 2008), which extends beyond the dyadic provider-costumer relationship to include multidirectional resource integration (Chandler and Vargo, 2011). This has been followed by an increased emphasis on the embedded and contextual nature of value and the importance of shared institutional logics and socio-cultural ties that influence value co-creation (Vargo and Lusch, 2011, 2012; Helkkula et al., 2012, Edvardsson et al., 2011, 2012; Jaakkola et al., 2015).

Notwithstanding these studies, the socio-cultural dimension of service experiences has seldom been the focus of service research to date. In particular, less is known about the enabling and constraining interplay between socio-cultural context and individual sense-making of value experience. However, as service experiences are acknowledged to be social and context sensitive, service studies need to respond to the call for greater contextual sensitivity in service co-creation research (Chandler and Vargo, 2011; Akaka et al., 2015). Thus the socio-cultural dimension of service experiences has to be further investigated in service research.

In this study, we draw on Consumer Culture Theory (CCT) in order to understand individuals making sense of their service experiences, meaning of resources and resulting value experiences within a cultural frame that affects their social actions (McCracken 1986). The specific purpose of our study is to analyse individual service culture and value experiences of everyday services. Specifically, we understand service culture as the collective cultural dimension of individual service experiences.

We explore consumers' challenges in relation to the consumption of everyday service and how they use their culturally situated understanding of imaginary, ideal service in their everyday lives. We focus on two regional service cultures representing the European North-South divide: Helsinki in Finland and Naples in Italy. Collective cultural ideals in different socio-cultural contexts create a foundation for individual service experiences as they drive consumption choices (Arnould, 2006; Arnould and Thompson, 2005.).

The remainder of the article is organized as follows: First, we characterize the collective cultural dimension of service experience; next, we present the Event-Based Narrative Inquiry Technique (EBNIT) (Helkkula and Pihlström, 2010) used for understanding of cultural dimensions in service experience. Following this, we outline and discuss our key findings in relation to how service consumers individually and collectively make sense of challenges relating to their current service experiences, and how they create imaginary ideal service experiences using their culturally situated understanding. We contribute to service research by addressing the cultural dimension of service experiences and resulting value experiences that has gained little attention in experiential value research. We suggest future research directions and encourage both researchers and managers to analyse the collective cultural dimension in order to co-create valuable service that facilitates customers' everyday lives.

2. Cultural dimension of service experiences

As previously outlined, in the service research, culture has been dealt with both within the international service management literature and service research more generally. However, extant insights from Consumer Culture Theory (CCT) help address this gap.

During the last decades, the socio-cultural aspects of consumption actions have gained momentum in the most of consumer research tradition, and in particular in CCT. Consumer studies have evidenced how consumers look for a complex mix of value from offerings including functional, economic and symbolic benefits, hedonistic experiences, and emotions (Holbrook, 1999; Sanchez-Fernandez et al., 2009). However, these studies remain still disconnected and scattered among different research fields with no unified perspective able to explain the complexity of consumer actions within the broader socio-historical frame of globalization and new market phenomena (Arnould, 2006; Arnould and Thompson, 2005).

An attempt towards a unified perspective has been recently provided by researchers grouped by Arnould and Thompson (2005) in the research tradition of CCT, which addresses the dynamic relationships between consumer actions and cultural meanings. According to Arnould (2006), the major contribution of CCT is the emphasis on studies on cultural complexity based on the assumptions of heterogeneous distribution of meanings and the multiplicity of overlapping cultural groupings existing within the market.

In particular, CCT research has provided a theoretical understanding of consumer choice and consumption in differing social and cultural contexts (Arnould, 2006; Arnould and Thompson, 2005; Holttinen, 2014). The ideologies and cultural ideals that drive consumption choices vary within in different socio-cultural context; in this sense culturally situated understandings influence service consumption (Arnould, 2006; Arnould and Thompson, 2005; Venkatesh, et al., 2006). Arnould et al. (2006) stress that consumers buy meaning and experience more than products. As cultural meanings are collective, and experiences individually determined, individual service experiences are co-created and embedded in a collective social context. Individual experiences may be different from those intended by commercial producers, who often aim for a specific type of a service experience (Cova and Dalli, 2009; Schau et al., 2009). In the CCT perspective, culture represents the real fabric of experience, meaning, and action (Arnould, 2006), and consumers are mainly seen as identity seekers (Venkatesh et al., 2006), who collectively co-create experiences in their daily lives. Thus, all kind of experiences - including of individual consumption - are inherently interactive and socially based (Arnould and Thompson, 2005; Schau et al., 2009). Consumers' belief systems and practices, together with their underlying structures, play central roles in building relationships with others and in their experience formation (Arnould and Thompson, 2005).

Many CCT researchers have distinguished in their empirical exploration the great variety of marketplace cultures built on the imbricated layers of cultural meanings and practices. The interest has been especially on the empirical analysis of fan communities (Kozinets 2001), brand communities (Muniz and O'Guinn, 2001; Schau et al., 2009) and consumer subcultures or tribes (Cova and Cova, 2002). Such

studies bring consumption practices into focus and illustrate how particular manifestations of consumer practices are constituted, sustained, transformed, and shaped in a social-cultural context.

Recently Thompson et al. (2013) put forward the idea that consumers may be seen as free and community embedded agents, who use consumption in meaningful ways in their everyday life contexts. Others stress the role of subcultures of consumption that offer co-creation opportunities for resource integration (Thomas et al., 2013). Thus, collective consumer culture and particularly sub-cultures denote the social arrangement in which the relations between lived culture and material resources including products and services are integrated in a collective co-creation experience.

Based on the assumption that people live in a social and culturally constituted world, overall these studies share a broad interest in the ways that culturally shared meanings and practices frame action and experience and are produced, reproduced, and transformed in market-related experiences.

More recently, highlighting the reflexive relationship between socio-cultural dimensions and consumer agency, culture has become a hot topic in CCT research. Scholars have investigated value-creation configurations and consumer actions that are not strictly tied to communities or similar closed groups of interest (Arnould, 2007; Peñaloza and Mish, 2011).

While service research and CCT can be seen as different streams of research, research, the alliance of SDL logic and CCT was already identified in 2006 (Arnould, 2006). For example, as highlighted earlier, SDL has presented the multi-layered and nested context of service ecosystems as a critical dimension in value co-creation (value-in-context) (Chandler and Vargo, 2011). This has inspired more authors to claim for a natural alliance between CCT and SDL, with cultural perspectives seen as the key mean to further elaborate on the value co-creation and market phenomena (Arnould, 2007; Peñaloza and Mish, 2011; Thompson et al., 2013; Akaka et al., 2015; Jaakkola et al., 2015).

Even if CCT and service research have found mutual interest in research, further elaborations on value and experience contextualization are needed. For example, Peñaloza and Mish (2011), Akaka et al. (2015), and Jaakkola et al. (2015) note that incorporating CCT informed cultural perspective to service research offers a promising point of departure for understanding the experiential view of value and contextual social and cultural aspects that frame consumers' experiences and practices.

3. Method

As part of our empirical study, we conducted 78 narrative interviews using Event-Based Narrative Inquiry Technique (EBNIT) (Helkkula and Pihlström, 2010). The interviews were conducted in Naples (48) and in Helsinki (30), in Southern and Northern Europe in May-October 2013 in order to explore different service culture contexts indicative of the North-South divide. The duration of the interviews were

between 3 and 20 minutes, and covered the age range from 18 to 65 years. Overall, the interviews explored the challenges consumers have in their everyday lives and their innovative ideas how these challenges could be solved.

All 78 respondents were interviewed and contacted by Master students, who were asked to select respondents within different age ranges (see Table 1). The students were trained in the use of EBNIT in advance. The EBNIT interview technique combines narratives interviews, focusing on critical events, with a projective technique using metaphors. Projective techniques have been used to transfer narratives from their customary context, such as culture, to new contexts, interlining relationships of the contexts from which they are borrowed (Goodman, 1988). The purpose of each interview was to find out the everyday service experience that the respondent would like to revise or change in his/her life.

In relation to the interview format itself, firstly respondents were asked to recall a challenging service experience in their everyday life (critical event), and then tell a story about their experience. After that they were encouraged to create an imaginary story of an ideal service experience. The metaphor of a magic wand was used to trigger respondents to think about service consumption beyond their normal everyday experiences.

The following questions were posed in the interviews:

- Please tell me about a service related event that happened recently or a service related event that happened in the past that you can remember: what happened or what is it that you don't like in your everyday service experience?
- Why would you like to change this service experience in your everyday life, what is it about the service experience that you like / don't like?
- Now I will give you a magic wand. Everything is possible. No financial, technical, time or other restrictions. In relation to the service experience that you mentioned, please tell me what would happen in an ideal case, where your magic wand made everything possible? How might you live/experience that event?

The interviews were transcribed, and two researchers had discussions with the interviewers in order to elaborate their observations. Then two researchers read through the results several times. The experienced challenges in service experiences, imaginary ideal service experiences, themes and service culture dimension emerged from the data. We now use the North-South divide to present our findings.

4. Findings

4.1 Finnish service experiences

In this section, we analyze and comment on the Finnish interviews in order to understand what are critical events in everyday service experiences and what constitutes ideal service experience. We take into consideration two main focal points: the challenging service experience highlighted by the respondent in question and how the respondent would like to change it, if everything was possible.

Respondents interviewed in Finland had challenging service experiences in relation to both public and private sector services. Finnish experiences underline that different types of public and private services were mainly functioning well. The challenge highlighted related mainly to the friendliness of customer service, or the human touch of the service.

For example, a middle-aged woman recounted her experience of using public buses. She recounted how a bus driver did not typically greet customers but, unexpectedly one morning, he said hello. Her ideal service experience is a service where bus drivers always say good morning and greet customers in a friendly way.

“Normally when I take the bus here in Helsinki the driver never says anything and you just pass in silence. But today I was a bit slow, and when I passed the driver he looked at me. Then he stared at me, and he said “huomenta”, (good morning in Finnish). I was startled and thought “Oh my God! He said good morning to me!” So I started to say “Oh, yes. Good morning. Good morning”. Oh dear!” Normally they say nothing. But there was another woman and she didn’t first understand either what happened. The driver said “huomenta” to the woman and she answer back “Oh, sorry, sorry. Yes, yes.”. (Anna, 36-50, Helsinki).

And she adds:

“I would take my wand and I would strike it on all bus drivers every morning so the people would wake up and think ‘Ok, I have to remember to say good morning to every passenger’” (Anna, 36-50, Helsinki)

She refers to her collective experience of this specific service culture in Helsinki:

“I think it is an urban legend. Everybody has some story about these drivers, as they say nothing. In case they say “Hi!”, you don’t know how to react.”

Lack of personal touch in service was also a challenge highlighted by the 50+-year old male Antti, who had had problems contacting a teleoperator’s customer service agent in order to correct a mistake in his invoice

“They are losing a lot, they look at the bottom line in all that they do, they don’t look at you as an individual, they look at the percentages, the thousands or tens of thousands of euros that they lose - or as they put it, of turnover - and they forget that behind every thousand euros there are one thousand customers who are paying for it. They really don’t have much need to change their customer service. But, you know, people get really cheesed off by the non-responsiveness. So, I mean, it’s a simple thing, it would be a simple thing to solve. (Antti, 50+, Helsinki)”

Some other respondents refer to unfriendly customer service in a fine dining restaurant/café; for example one respondent tells about his bad experience because the staff in the restaurant has a really bad attitude towards a young family, because they have their baby with them.

Another respondent in a fine-dine restaurant found that the waiter wasn't nice and seemed quite unwilling to serve. The wine served with the main course was really cold and the respondent didn't like it, because it was red wine and it's not supposed to be so cold. After a while, the respondent went to the kitchen and said that the wine is too cold, but they just answered: "we can't do anything about it, that's the temperature we have in here." And the respondent was sent back to his table.

Their ideal experience also related to a restaurant service, which would be service-oriented, meaning that the waiter was courteous and welcoming and offers laid-back and personal service, but which is not too meddlesome.

Also a young woman refers to unfriendly workers talking about poor service at the local supermarket, Valintatalo in Töölö, where staff members never say "hi" and are not nice with customers.

"The checkout staff are not nice, and they don't even say "Hi". They just wander around and it is otherwise also a bad store." (Jola, 18-35, Helsinki)

And her ideal experience is one in where personnel is kind:

"In my ideal service someone is at all times at the cashiers' desk. Also, there would be a staff member in the store that you can ask if you search for something... Well normal customer service... Improvement in that. (Jola, 18-35, Helsinki)

4.2 Italian service experience

In this section we analyse the findings of the Italian interviews in order to understand what are the critical events about everyday service experiences and ideal imagined service faced by Italian consumers in Southern Italy. The majority of respondents refer to a poor performance in public service, in particular they refer to three main categories of service: public transport, public street maintenance, and public healthcare service. The major concern was the functioning of different types of public services, especially the mal-functioning of public transportation. For example, the unreliable schedules caused challenges in respondents' everyday lives.

A 44 -year old storeowner tells about her challenges using public buses and trains and her imaginary ideal experiences. In one instance, the respondent outlines the inefficiency of public transport.

"I am a Neapolitan storeowner, I cannot organize my work because of the many train delays, bus delays, subway delays and often I am forced to take a taxi with expenses out of my budget (Anna, 44, Naples).

Her ideal experience is about perfectly connected roads and enhanced service as the following illustration shows:

“Streets would be perfectly connected, with adequate transport services, with more lines, more rides, better information. [...] tables and billboards suited to understand the times and rides during the day. Faster construction of new subway lines, and better maintenance of old lines (Anna, 44, Naples).”

Also another respondent had difficulties organizing his work due to poor public services:

“There was a delay of several minutes and I arrived late at night – then had problems to do my work” (Guido, 18-35, Naples)

His ideal experience is about more trains, no delays, improved punctuality:

“Greater focus, greater efficiency and quality. Trains on time, more controls, to have higher earnings, better punctuality” (Guido, 18-35, Naples)

Some other respondents refer to the fact that roads were not in good shape. A man in the age range of 51+ tells of his bad experience due to the poor streets maintenance, which caused accidents and even punctured his tyre:

“Once, after a storm, while I was driving the same stretch that I take every to the office, there was a hole hidden under a puddle of water that I went into, fully breaking the rim of my tyre. Of course I had to change the wheel in the first SOS area and this has led to a considerable delay in getting to work, a lot of stress and a certain fear caused not only by the unexpected blow, but also by the inability to quantify the damage. All this, of course under the effects of adverse weather conditions” (Claudio, 51+, Naples)

In his ideal experience he would like to have people who make their work honestly using high quality materials and innovative techniques in order to restore radically road surface.

“I would make a classification of all actions necessary to restore conditions of the streets. I would just like everyone carry their work honestly (Claudio, 51+, Naples)

Also another respondent refers to his bad experience due to poor street maintenance:

“There are consistently so many holes in the streets and roads that while driving I punctured the tire” (Antonio 26-35, Naples)”.

His ideal experience is to have unlimited funds to repair the streets:

“The funds at my disposal to improve city streets” (Antonio 26-35, Naples).

Some other respondents tell about inefficiencies in public healthcare service. For example, a middle-age woman complains about her experience in a healthcare center:

“I had a medical examination, there was a malfunction with the reservation system and I had to wait so long for my appointment.” (Simone, 51+, Naples)

Her ideal experience is a more efficient service:

“I would like that the service would be more efficient, that appointments would take place at the time that they were booked for ... and also increase the quality of service as the tools available are inadequate and not technologically advanced”. (Simone, 51+, Naples)

While the narratives describe individual service experiences, many respondents emphasize their understanding of existing service culture being socially constructed. In the following extracts 24- and 35-year-old women, and a 51-year-old man open up the existing service cultures by referring to their friends and the notion of “we” or “everybody”.

“I, like other people, was waiting for a train. Only after 30 minutes we started to talk about the discomfort. During the first 30 minutes we thought it was the usual delay. (Alessia 24, Naples).

“One of the services that we use every day and that usually brings us a lot of inconvenience is public transport, namely the service offered by the Circumvesuviana (Neapolitan train) line”. (Marina, 35, Naples)

Also another respondent refers to the notion of “everybody” in the following extract:

“Surely everybody knows that every time we drive our vehicles to work or another destination we are confronted with a quite difficult reality in which protagonists are our streets.” (Claudio, 51+, Naples).

5. Discussion:

Our findings show that existing regional service culture creates the foundation for sense-making of value (1) of current service and value experiences, (2) expected service and value experiences, and (3) imaginary ideal service and value experiences.

First, our findings show that existing service culture affects how people make sense of their service experiences of using that service. While respondents in Naples experienced public service, and especially the malfunctioning of public transportation as challenges in their everyday lives, respondents in Helsinki experienced the non-friendly service encounters as challenges. Even if the cause for not-so-good value experiences was different in both countries studied, both Naples and Helsinki respondents were disappointed with the value of service. Even if these experiences were individual, respondents both in Naples and in Helsinki referred to socially constructed service culture experiences. Accordingly, existing service culture, and how customers interpret it, creates a platform for individual service and value experiences. We contribute to service experience and value research by presenting an empirical study of regional service, and extend experiential service experience and value experience research that has mainly focused on individual service experiences. We provide empirical narrative data on public service, which has gained little attention in service culture research. We draw on recent service research that has extended its interest for collective service experiences and value experiences

(Jaakkola, Helkkula and Aarikka-Stenroos 2015) and research in consumer research focusing on co-consuming groups (Goulding et al. 2012; Carú and Cova 2015), especially for products, brands, consumer activities in brand communities (Schouten and McAlexander, 1995; Muñiz and O'Guinn, 2001; Cova et al., 2007).

Second, our findings show that existing service culture affects expected service experiences. For example, in relation to public transportation, the expected service experiences in Naples were very different from the expected experiences in Helsinki. While respondents in Naples had a pre-expectation of malfunctioning public transportation, respondents in Helsinki expected buses and trains to run on time. Accordingly, respondents in Naples expected buses and trains to be late or overcrowded, as in Helsinki a ten-minute-delay was considered to be a long delay and an unpleasant service and value experience.

In our study, we focus on the customer perspective as we study expected service experiences. The introduction of service economy as the foundation of business (Pine and Gilmore, 1999; Vargo and Lusch, 2008) has transferred the focus from service quality to service experiences and value experiences. We extend existing research on the Gaps-model, presented together with the SERVQUAL scale by Parasuraman, Zeithaml and Berry (1985) by focusing on service experiences and value experiences from the customer perspective. Accordingly, as the GAPS-model focuses on service quality, we address customer-experienced value. It has been shown that service quality affects customer satisfaction (Parasuraman et al., 1985; 1988; Howat and Murray, 2002). Quality has mostly been measured by standards, which are set by the service provider. Thus, quality does not measure a customer's subjective experience of the service or value. Instead, quality measures how the standards set by the service provider have been reached. In organization studies, Kumar and Kumar (2015) indicate that in addition to organizations, also customers may be influenced by different cultures and different regional cultures in their expected and perceived service. Our research extends previous research by focusing on customer service and value experiences instead of quality; and by emphasizing that regional service culture may be an essential factor when customers make sense of their service and value experiences.

Third, the findings show that customers' imaginary innovative ideas for an ideal service were strongly linked to the existing service culture. In Naples respondents imagined buses and trains running in time and not being too crowded to facilitate their everyday routines and actions. In Helsinki, imaginary ideal service experiences were related to better functioning of public transportation, as respondents' expected experiences were based on the existing service culture of well-functioning public transportation. We draw on recent service research on imaginary service experiences (Helkkula, Kelleher, Pihlström, 2012; Jaakkola, Helkkula, Aarikka-Stenroos, 2015) and extend individual experiences to collective experiences of service culture. Our study therefore contributes to service research on experienced value by emphasizing service culture as socially constructed foundation for sense-making of both lived and imaginary value experiences.

To conclude, this is one of the first studies to focus on the cultural dimension of service experiences and its implication to value and expected service innovations. We contribute to service research, and especially to SDL, by drawing on CCT by extending individual experiences to collective experiences of service culture that

creates a foundation for current service and value experiences, expected service and value experiences, and imaginary ideal service and value experiences. We argue that even if culture has received little attention in current service and value research, it opens avenues for understanding how customers make sense of their service and value experiences in relation to expected experiences, as well as their expectations and desires for future service experiences.

5.1. Implications

The study has implications for service researchers and managers when they plan to develop and innovate service. Both local and global service needs to adapt to existing service cultures and its historical, socio-material and cultural context (Gherardi, 2008).

Respondents' service experiences indicate that existing service culture affects respondents' expected service experiences and their imaginary experiences of an ideal service event. As service experiences are the foundation to making sense of value experiences, existing culture in service affects customers' value experiences.

In case customers previously experienced mal-functioning service up to the extent that it has created a reputation for mal-functioning service culture, it affects customers' value experiences.

5.2. The limitations of this study and future research

This study has focused on two empirical data sets on regional service cultures in Helsinki and Naples. Different regional service cultures offer a rich source of empirical data for future research. In addition to different types of regional service cultures, service cultures may relate to different consumer groups that may be geographically spread out and for example based on web-based interaction.

As sense-making of customers' imaginary, expected service experiences for future service are affected by existing service culture, we encourage research in service development and service innovation to consider service culture as they involve customers in co-creation of innovative service ideas. Existing service culture may indicate customers' expectations for improved service.

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Service Dominant Logic – how to systematize service business

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Digitalization is changing the world quickly, industrial boundaries are vanishing, and competition is truly global. Digital transformation is disruptive, the new, unseen and born-global services are amplifying demand for service-oriented business- and marketing logic, where value creation between actors is a key element. The main aim of this paper is to describe cornerstones for systematizing co-creational service dominant business logic in the rapidly changing market environment. We review literature to find out what are the approaches behind service dominant logic and value co-creation in service marketing, how the value stream optimization based on Lean – philosophy was aligned with the other encountering theories, and then are creating the encountering framework for systematically utilizing the service dominant logic in business-to-business environment.

1. Introduction

The baseline for Service oriented marketing is that customers consume service (plural), regardless of whether they buy goods or services, service is a value creative process, and service marketing shall be seen as relationships, networks and continuous close interaction (Grönroos, 1990: Lovelock; Gummesson, 2004: Vargo; Lusch, 2004). For the clarification Service in this context shall be seen as a perspective on value creation (value in use), not only as a part of offering (Edvardsson et al., 2012). The most significant difference between the industrialization driven product marketing and globalization driven Service marketing is seen in the definition of value creation. Most of the researchers are agreeing that in Service economy customer is always a value creator, but the definition of value co-creation is not exactly defined. Still we can see that Service Dominant Logic (Vargo; Lusch, 2004: Vargo; Lusch, 2008: Vargo; Lusch, 2014) is giving a sound foundational framework for exploring the ongoing encountering process between the actors in BtoB service economy, which is globally rapidly increasing business sector.

Value creation is difficult if not impossible to unambiguously define, but is used as a baseline for many world changing theories, like Lean thinking, which is described as a value creating process that's capable (value), available (value streams), adequate (perfection), flexible, flowing, and pulled (Womack; Jones, 1996).

Value co-creation requires a change in the dominant business logic from 'making, selling and servicing' to 'listening, customizing and co-creating'. This means it is also cross-functional: It assumes and requires alignment between all the operational or organizational functions. Later studies (Grönroos, 2008: Grönroos; Ravald, 2011) are questioning that supplier is always the value creator, but agreeing it can co-create value with the customer in certain alignment. This alignment and encountering cross

functionally between the supplier and customer organizations seems to be the enabler for later mentioned co-creative BtoB relationship.

Because customer is always seen as a value creator, value co-creation can be also seen as Pull System, which is an integral part of Lean Thinking and Lean management. In Pull System the control for flow of resources is determined by the end user, just like Vargo and Lusch (2004) are describing in one of the strongest SDL foundation points; “Value is always determined by beneficiary”. Lean thinking is eliminating wasteful practices and determinates and increases value-producing practices of the company, development or operations.

Encountering in this context means two-way actions between the customer and supplier, can also be referred as touch points, and can be initiated by either party. Encountering process is in the middle of the value creation (and co-creation), and is therefore taken to focus in this study. Theoretical foundation for our encountering – process definition is based on Payne et al. (2008) studies, but is taken to more practical level in use, and tweaked to fit into another value creation–related theories based on learnings over five years.

Lean approach for encountering is so called “Lean Startup” – model (Ries, 2011), which in brief is a process which is answering question; How can we learn more quickly what works, and discard what doesn't. Originally developed together with his mentor Steve Blank. Blank has told this methodology founding strong influences not only from Lean Thinking (Womack; Jones, 1996), but also value driven Entrepreneurial Management (Drucker, 1985; Stevenson; Jarillo, 1990), and Discovery Driven Planning (McGrath; MacMillian, 1999).

Testing of value creation in Lean Startup – model is done iteratively through so called Minimum Viable Product (MVP) – development process (Ries, 2011). This strategic MVP process is iterative, continuous and cross-functional. (Payne et al., 2008) presented all these three themes as common for the companies which have decided to utilize their SDL encountering process, which is one proof of the theoretical and practical connection between SDL and Lean.

Based on above the main aim of this interpretive case study research is to describe cornerstones for systemization of service business. Moreover, we aim at conducting a feasibility study of S-D logic and illustrate a practical application of the co-creation framework by applying Action Design Research (ADR) method. This can be condensed into following research questions:

- What are the elements Lean SDL Encountering framework to systematizing service business?
- How to systematically utilize the service dominant logic in business-to-business environment?

In this article, we first review literature to find out what are the approaches behind service-dominant logic. Second, we describe the research methodology and critically evaluate the quality of the research. Third, we study how to systematically utilize the S-D logic in practice in business-to-business environment using single case organization. Fourth, we discuss and analyze the findings in relation to existing theories in order to represent a generalized solution addressing a class of problems moving conceptually from an organization-specific instance onto a more abstract level. Finally, we conclude the paper with scientific and practical contribution of the research.

2. Literature review

2.1. Service Dominant Logic, Service Marketing, Lean Thinking and Entrepreneurship are branches of the same tree

The starting-point for Service oriented marketing is that customers consume service, regardless of whether they buy goods or services, and marketing shall be seen as relationships, networks and interactions. Service Dominant Logic (Vargo; Lusch, 2004: Vargo; Lusch, 2008a) can be seen as a foundational framework for Service Marketing, not as a new theory, like Grönroos (Grönroos; Ravald, 2011: Grönroos; Gummerus, 2014) was pointing out, and authors themselves concluded later (Vargo, 2011).

In Service Marketing, just like in SDL, the customer has been seen in the middle of value creation process (Sheth et al., 2000), and value creation is based on core competencies (Prahalad; Hamel, 1990). The value creation approach was introduced already by Michael Porter (1985).

Goods dominant logic had its roots in the industrialization, just like traditional management and organizational structures (Vargo; Lusch, 2014). Digitalization is accelerating the globalization, and is driving us away from the fallacy of mass-production. Digitalization is giving us more opportunities to get individual service for our individual needs, and is returning the appreciation towards craftsmanship.

Firm's ability to understand customers' value-creating processes, to create solutions that enable improved value creation, to create demand for these solutions, and to sell these to customers, receiving compensation based on customers' value in use (Bonney; Williams, 2009), is also baseline for both, Service Marketing and SDL.

Sawhney (2006) is describing how the product-centric view for marketing is too narrow and doesn't follow the evolution of human behaviour and thinking, and therefore is expanding the Solutions definition for covering the whole value creation chain. He complains, that solution - definition is loosely defined, and is defining solution as "an integrated combination of products and services customized for a set of customers that allows customers to achieve better outcomes than the sum of the individual components of the solution."

Solution marketing is defining outcome from customer's perspective, just like SDL and Lean. Customer needs holes no drills, benefits no features, and they do they not just are (Sawhney, 2006).

Customer liaison process in Solution Marketing is described as a sequence of activities that are logically connected, called a customer activity cycle (Sawhney, 1999: Sawhney et al., 2004: Vandermerwe, 1993, 2000).

The customer and supplier activity in Service Marketing relationship can be mapped in detail through an activity mapping process called activity blueprinting or customer experience mapping process (Seybold, 2001: Bitner et al., 2008).

Already in 1980's Drucker (1985) presented entrepreneurial management, which is responsive for value creation opportunities. He presented Entrepreneurial manage-

ment as a movement in which the economy is seen as biological process. He put innovation over invention, where Innovation was described more or less as creational process through co-creation and resource integration, and effectiveness over efficiency.

Lean thinking has its roots in Toyota Production System (Ohno, 1988). Lean thinking is based on incremental value creation, pull-directed value stream, effective flow of value creative particles (eliminating waste), and drive to perfection (quality is not a question but built into the system). Womack and Jones (Womack; Jones 1996) were describing value definition related to “specific product (service) with specific capabilities offered at specific prices through a dialogue with specific customers”, which can have translated as a co-creative resource integration.

In this article we conclude, that all of these ideologies are basically presenting the same idea; Industrialization was leading to productization, where all the offerings were compromises. Today all the economies are service economies, and value creation has become more complex. Service Dominant Logic is providing a good framework for understanding the process, where there are no barriers between the supplier and customer, and value creation is pull-directed and co-created.

2.2. Service Dominant Logic

Service Science is seeing Service systems as value creational configurations of people, technology, value propositions and shared information (Maglio; Spohrer, 2008; Vargo; Lusch, 2008b; Vargo; Lusch, 2014). Originally Vargo and Lusch (2014) introduced the Service-dominant logic (SDL) through ten Foundational Propositions (FP). They were seeing Service as the application of competences benefitting each other (co-creation), and Service in the focus of economic exchange. This thinking is leading to the shift from operand resource exchange to operant resource exchange (competencies, knowledge and skills). Within this logic the operant resources are the fundamental source of competitive advantage. Goods are just a distribution mechanism for service provision.

According to Vargo and Lusch (2004; 2008a) Service Dominant Logic is based on the implication that value is defined, and co-created with the consumer (FP6), where core competencies are the competitive advantages (FP1). It means wide cross-organizational collaboration between the supplier and customer. Value co-creation means change through organization. Turning marketing logic from ‘making, selling and servicing’ to ‘listening, customizing and co-creating’ is requiring alignment between marketing, development and delivery organizations. Approach is based on customers’ strategic needs. Organizational foundation of SDL is in collaboration, and SDL is seeing all the social and economic actors as resource integrators, and therefore all economies as service economies.

SDL is defining value always determined by customer, and always created together. This definition is questioned in general (Grönroos; Voima, 2013), where service marketing based approach is seeing value creation to be shared sometimes as a value in use (SDL) but sometimes as a value in exchange, depending the maturity and relationship of organizations and actors. When value as a definition is not mathematically exact, and value creation therefore cannot implicitly be defined, SDL shall be seen more as a Service Marketing framework than implicit theory.

Applying Service-dominant logic means that the firm is not restricted to making value propositions only, but also gets opportunities to actively and directly participate in value creation with its customers.

Later the founding fathers of SDL have returned to further explore SDL, and presented that Service Dominant Logic is the reconceptualization of Service as the process where an actor is using its resources for the benefit of another (Vargo and Lusch 2014). They were presenting the original foundation points in four axioms;

- Axiom 1 was underlining FP1; Service is the fundamental basis of exchange. Service is always exchanged to service (operant serources).
- Axiom 2 was underlining FP6; The customer is always a co-creator of the value (interactive value creation process).
- Axiom 3 was underlining FP9; All economic and social actors are resource integrators. Value creation is network of networks.
- Axiom 4 was underlining FP10; Value is always uniquely determined by beneficiary; value is experiential and conceptual.

They were also presenting core conceptualization in more details, claiming that all actors (individuals, firms, nations) are fundamentally doing the same core activities in engaging to the the resource integration, exchanging service to service, and acting simultaneously as consumers and producers.

Akaka and SDL founding fathers (Akaka et al., 2013) were exploring the principles and management of Service ecosystem in the cultural context, talking again more about framework than theory. They were presenting Resource Integration in three levels, Micro (individual), Meso (firm), and Macro (nation). This framework was taking institutions along to the value creation with culture and norms. Interesting notion is, that while going deeper to the system perspective, they were seeing all marketing business to business related.

Service Innovation in the SDL framework is broadened to three different elements; service ecosystem, service platform, and value co-creation (Lusch; Nambisan, 2015). The study was seeing common worldview, architectural alignment, and structural flexibility of organizations required for co-creative service innovation. In our study these elements were at present when co-creative service innovation was occurred.

2.3. Lean Thinking

Lean thinking is having its roots in Toyota Production System (Ohno, 1988). Lean thinking was studied, explained and popularized by Womack (Womack; Jones, 1996) and later explained in more details by Liker (Liker, 2004). The critical measure for Lean is value. Baseline is, that value is determined and defined by the customer.

The goal in Lean processes, from production through management, thinking, and processes to customer interface, is to get more value created with less waste, where waste (originally Muda in Japanese) can be defined as any activity which is usind resources but doesn't create value.

Value stream has always be pull-directed, as the value is defined by customer, and process has to be continuously improved, driving to perfection. In Lean process quality of service has to be built into the system.

Principles of Toyota Production System (TPS) are I) Respect for people, II) Continuous Improvement, III) Pull-directed process, IV) Solving root problems, V) Continuous learning in organization and partner networks, VI) Long term thinking over short term goals (Ohno, 1988).

In TPS personnel represent core competences, and core competence in a service society is a base of exchange. Good employee experience is the foundation for good customer experience. Continuous improvement has to be in the culture. This is leading to the iterative approach for process development and organizational learning. Visual controls and transparency are supporting the cross functional learning, titles are not important but respect for others, teamwork and mutual trust are.

Principles of Lean thinking are; I) identify value (value is defined by beneficiary, pull-direction), II) map value stream (seamless resource integration with customer), III) create flow (cross-functionality, culture), IV) establish pull (co-creation with customer), and V) seek perfection (iterative development) (Womack; Jones, 1996).

As already recognized, value is never easy to define, and every actor in the economy is wasting resources in some forms. In Lean thinking firms just have to think the created value from its customers' perspective, learn, iterate, improve, and revisit the value definition. When the value of service is defined, firm has to define the target cost for running the service when all the waste from the process is removed (Womack; Jones, 1996). In short this means that value for the service is co-created with the customer, price for the value is defined by customer, and cost for running the service is defined by supplier.

Eric Ries (2011) presented Lean Startup philosophy for answering the question How can we learn more quickly what works, and discard what doesn't. Learning process (Build-Measure-Learn) is clearly based on the value creation, and can be seen as Lean Encountering process. The iterative Build-Measure-Learn – process is the core part of the Lean startup methodology, explaining how the ideas can iteratively have turned into products, measuring value creation from customers' perspective, and then learn whether to persevere or pivot the idea. Haeckel's Sense-and-respond - centred view (Haeckel, 1999) is bridging Lean Startup philosophy to the Service Dominant Logic foundation. Main idea in Sense-and-respond – approach is to cultivate relationships that involve the customers in developing customized, competitively compelling value propositions to meet specific needs.

Ries' Lean Startup philosophy is also closely related to so called Design thinking (Brown, 2008), which combines deep end-user experience, systems thinking, iterative rapid prototyping and multi-stake holder feedback together (Inspiration – Ideation – Implementation). Maurya's Running Lean (Maurya, 2012) is filling Lean Startup approach with process for iterating the plan before running out the resources. It tackles to the co-creative value definition, where ideas and vision shall be tested with the minimal waste of resources.

2.4. Conceptual framework for value co-creation

Payne et al. (2008) explored the value co-creative encountering in the context of SDL and developed a conceptual framework for understanding and managing value co-creation between customer and supplier. The literature review and our empirical research confirmed the need for a practical value co-creation framework consisting of three main components, I) Customer value-creating processes II) Supplier value-creating processes and III) Encounter processes — the processes and practices of interaction and exchange that take place within customer and supplier relationships and which need to be managed in order to develop successful co-creation opportunities.

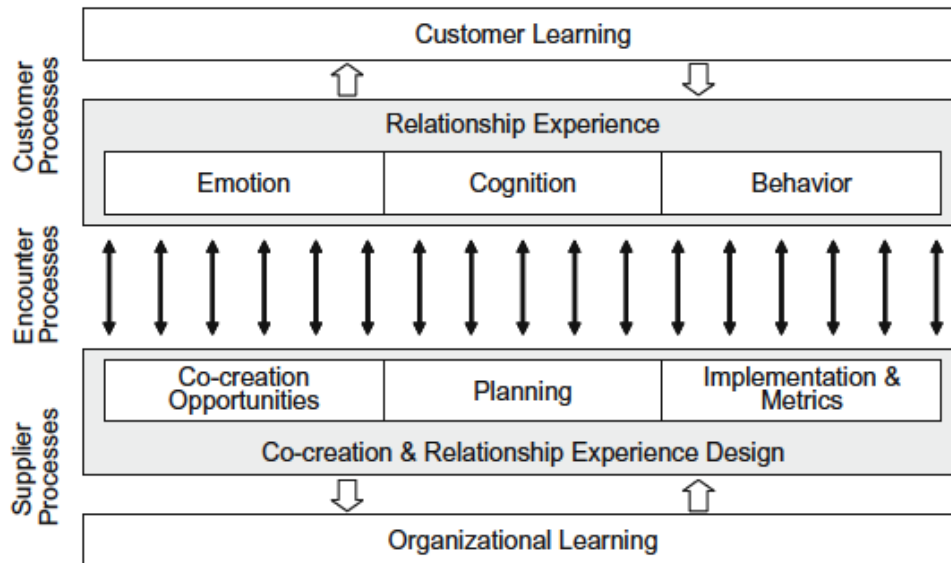


Figure 1. Conceptual framework for value co-creation (Payne et al., 2008)

In the value co-creation framework (Payne et al., 2008) Customer Processes are divided into three Relationship Experience based entities; Emotion (feelings), Cognition (thinking), and Behaviour (doing). In addition, Supplier Processes are divided into Co-creation and Relationship Experience Design entities. Finally, there are the Encounter Processes inbetween the Customer Processes and Supplier Processes.

In our research we used the Payne et al framework for data gathering and analysis regarding the customer encounters of the case organization. However, during the research period we ended up adding elements from two other frameworks (Bitner et al., 2008: Cova et al., 2002) and propose an improved version in Discussion section of this paper.

2.5. Lean SDL Encountering Process

In our empirical research we will use the Payne et al. (2008) framework for data gathering and analysis regarding the customer encounters of the case organization. However, during the research period we ended up adding elements from two other frameworks (Bitner et al., 2008: Cova et al., 2002) and propose an improved version in this paper.

In our synthetised framework all three are further divided into three subdomains (figure 2), Onstage, Backstage and Support – relations, based on the Service Blueprint

concept (Bitner et al., 2008). Solutions Sales – framework (Cova et al., 2002) is defining five stages in processing the customer network value proposition, Identification of actors, targeting actors, Identifying stakes for each actor, setting up an approach for the targeted actors, and a value creation approach, and our five years experience in co-creative value creation on the field. These three levels of Customer Relationship Experience based encountering processes are identified as in figure 2.

CUSTOMER	Emotion	Cognition	Behaviour
Onstage (co-creation, creating pull)	Introduction Creating trust	Service Innovation	Engagement
Backstage (resource integration)	Customer Selection	Service Execution	Identifying key actors
Support (service exchange)	Identification of Value	Cross- Functionality	Value Stream
SUPPLIER	Learn (Ideas)	Build (Service)	Measure (Data)

Figure 2. Lean SDL Encountering framework.

The Supplier processes are seen as a value steam, where core competences are the value particles, and suppliers' efficiency can be measured with value density (level of competency), and value stream density (optimizing utilization rate of value creating actions) based on Lean thinking (Hines et al., 2004: Liker, 2004: Womac; Jones, 2003). Therefore Supplier Processes, Co-creation and relationship experience – related entities, are shared following Lean Startup model to Learn, Build, and Measure (Ries, 2011).

Customer liaison process in practice can be seen as a sequence of activities that shall be logically connected (Customer activity cycle: Sawhney, 1999: Sawhney et al., 2004: Vandermerwe, 1993: 2000). We are targeting to short iterations in activity cycle, and to rapid prototyping cycles in service innovation for identifying the real value creation opportunities and best practices with the mini-mum waste of resources.

3. Methodology

3.1. Research Approach & Case Description

This paper describes a longitudinal interpretive case study (Klein: Myers, 1999; Walsham, 1995: 2006) to provide in-depth knowledge about systematization of co-creational service-dominant business logic. The research was conducted in 2011 –

2015 as Action Design Research (Sein et al., 2011) in a publicly listed company providing professional services.

The case organization in this research is professional services provider Siili Solutions and its two customer encounters. Siili was founded in 2005 and has lately grown very rapidly and profitably: the average annual revenue growth has been 30% with about 10% EBITDA in 2009-2014. The initial public offering stock price was 7,00 euros (15.10.2012) and the all-time high stock price amounted to 20,25 (10.4.2015) euros, which equals to 189% increase. The cases are described in more detail in the Case Studies section of this paper. The cases are introduced anonymously without any detailed customer specific information for maintaining confidential relationship between the customer and the supplier.

The first and second authors of this research are 'involved researchers' and third author is 'outside researcher' (Walsham, 1995). The involved researchers are members of the management team of the case organization (since 2010 and 2013 respectively) and actively take part in the research & development (R&D) activities.

The primary objective of this case study was the design and implementation of new business logic and encountering process for the case organization. Since the beginning of this internal R&D initiative it was linked with academic research to improve credibility of the internal development, to guide development activities with systematic frameworks and to provide novel contributions for external practitioners and researchers.

3.2. Action Design Research & Critical Evaluation

3.2.1. ADR method

Action Design Research (ADR) is a research method for generating prescriptive design knowledge through building and evaluating an ensemble of IT artifacts in an organizational setting (Sein et al., 2011). The ADR method is described below and illustrated in Figure 3.

ADR consists four stages including several iterations (of stages 1-3) in order to provide participating researchers and practitioners with many opportunities for interaction:

- **Stage 1 Problem Formulation:** identification of a practice-inspired research opportunity based on existing scientific theories
- **Stage 2 Building, Intervention and Evaluation (BIE):** researchers design iterations of the artifact, which are consecutively improved with real-life organizational use. In BIE the initial problem and the design artifact are continuously evaluated in order to provide feedback for next iterations.
- **Stage 3 Reflection and Learning:** scientific reflection of the research problem, chosen theories, and the designed artifact. The intention is to enable application of the learning from building a particular practical instance to a wider

class of problems. This should result in new knowledge for other practitioners and researchers.

- **Stage 4 Formalization of Learning:** researchers formally describe the realized accomplishments and create general solution concepts or design rules.

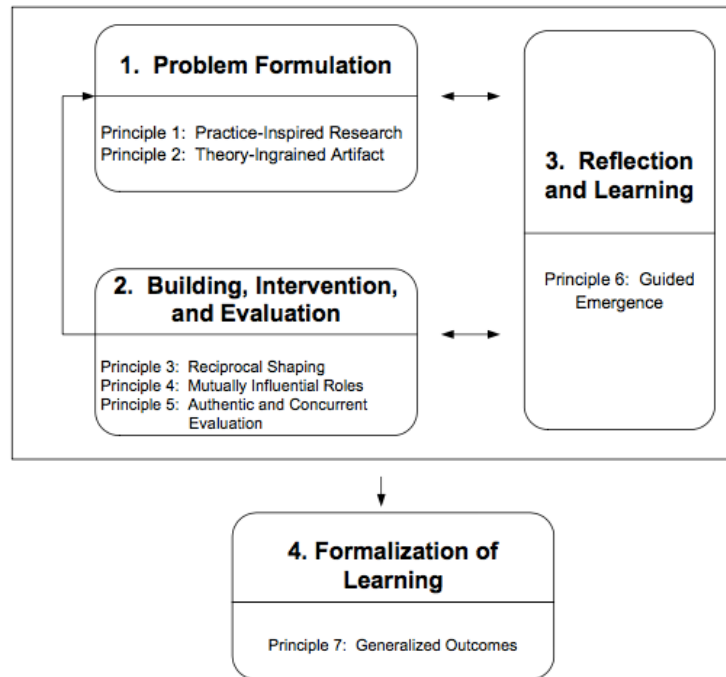


Figure 3. ADR method: Stages and Principles (Sein et al., 2011)

3.2.2. Evaluation of Research

In order to improve the validity of research, it should be guided and evaluated by explicit quality criteria (Sarker et al 2013). In this section we critically evaluate our interpretive case study research according to the seven principles published by (Sein et al., 2011).

PROBLEM FORMULATION

1: Practice-Inspired Research. Our research team started from a real-life problem in the case organization, but did not settle for a simple consultant solution. Instead we created generalized knowledge that can be applied to a class of problems regarding encountering process in professional service organizations.

2: Theory-Ingrained Artifact. We used existing scientific theories in many ways during the research: I) we conducted a literature review to help the initial problem formulation and the design iterations of the artifact, II) we used several theories to analyze the customer encounters of the case organization, III) we enriched existing scientific knowledge with our research discussion and generalizations.

BUILDING, INTERVENTION, EVALUATION:

3: Reciprocal Shaping. We developed simultaneously Siili's organization and processes as well as the IT solutions of the case organization's customers.

4: Mutually Influential Roles. The involved researchers and the case organization em-

ployees brought practical knowledge and practices, while the outside researcher together with involved researchers brought their knowledge of scientific theories. As a result, both roles learned from each other.

5: Authentic and Concurrent Evaluation. We evaluated the research continuously during the research so that scientific knowledge was embedded in the process of building the artifact and not a separate stage following the building.

REFLECTION & LEARNING:

6: Guided Emergence. The resulting artifact of our research reflects the learning and continuous shaping during 2011-2015 in a real-life organizational setting and evaluation by research participants and external users.

FORMALIZATION OF LEARNING:

7: Generalized Outcomes. In this paper we represent a generalized solution addressing a class of problems moving conceptually from an organization-specific instance onto a more abstract level. In other words, our solution includes generalization of the problem and solution instances but leave derivation of design principles to further research.

3.3. Data Collection and Analysis

This research started in Finland in 2011 when a professional service provider company was looking for a unique competitive advantage and the first author was inspired by theories of Service-Dominant logic and Lean Thinking. The goal was to create an innovative service offering with supporting organizational structure and management and there have been several iterations by the publication of this paper in 2015.

The involved researchers are members of the management team in the case organization and, therefore, able to access all the internal material in the organization. The interaction and interviews in the case organization were not recorded, because it could have endangered the real-life setting and resulted in less truthful data collection (Walsham, 2006). However, the involved researchers wrote constantly research memos and collected secondary research material (e.g. management documents, reports, instructions, emails) while taking part in the development activities of the case organization.

We continued the interpretation of the data throughout the project, but decided to “step back and examine the interpretations of fellow participants” (Walsham, 2006) in June 2015 and to publish the findings in a peer-reviewed scientific conference for feedback. We aimed at analyzing and describing interpretations about encountering process rather than finding causal relationships (Gregor, 2006). Therefore, we mapped the empirical findings to the concepts of theoretical frameworks by (Payne et al., 2008; Vargo; Lusch, 2008a; Vargo; Lusch, 2004).

During the research process, the involved researchers conducted several exploratory workshops to analyze a vast variety of data and to construct a comprehensive view of current situation of the service offering between 2011 and 2015. The analyses

were later on validated in confirmatory workshops with the outside researcher. Results of the interviews and workshops are summarized in the following interpretive descriptions regarding previous development activities and the current situation.

The case company developed its offering from resource and project sales towards co-creative solution model and moved forward in the value chain from 2011 to 2015. Required organizational changes were implemented and the new enterprise system to support cross-functional skill-based competence management was developed. Value creation was a key driver in the iterative business development process, which we are proving through analysing two customer encounters of the case organization.

Based on Customer activity cycle we can identify Pre-phase (Learn), which can be seen as an Introduction, During-phase (Build) as creation of demand (Pull), and Post-phase (Measure) is covering the Leverage and Maintenance – phases. For making the different customer cases comparable we are using the previously introduced domains.

In our case the Physical evidence can be seen in Web, Reputation and Demonstrations, and actions can be shared to three different organizational dimensions; Business, Technology and Excellence, and all these three can again to be shared to operational, tactical and strategic levels.

Value co-creation requires a change in the dominant logic for marketing from 'making, selling and servicing' to 'listening, customizing and co-creating'. It is also cross-functional: It assumes and requires alignment between those organizational functions which make the customer promise and those which deliver the customer promise. In practice the required approach is relative to Lean Thinking, which is also optimizing value stream based on end user needs (pull).

We are studying and reflecting cases where the service provider is co-creating value in the professional service business environment, and are presenting the framework for systematic approach for encountering in such a relationship.

(Payne et al., 2008) explored the nature of value co-creation in the context of S-D logic, and developed a conceptual framework. They confirmed the need for a practical process-based value co-creation framework consisting of three main components; Customer value-creating process, Supplier value-creating process, and Encounter process. This framework is used as a foundation for our description.

We have combined the Lean Thinking based encountering process called Lean Start-up, which in brief is a process which is answering question; How can we learn more quickly what works, and discard what doesn't. Main principles in Lean thinking related encountering are; Focus on your customer, vision his need, describe the iterative approach how to get there, remove inefficiencies and waste, seek continuous improvement, empower the people operating in process and do all this in systematic way.

4. Case Studies

In our research we used the Payne et al., (2008) framework for data gathering and analysis regarding the customer encounters of the case organization. However, during the research period we ended up adding elements from two other frameworks

(Bitner et al., 2008; Cova et al., 2002) and propose an improved version in Discussion section of this paper. We use the improved framework to analyse the following cases.

4.1. Case Organizations

Siili Solutions Plc (the case organization in this research) is a publicly traded management consulting and technology integrator company employing several hundreds experts in Europe. The company was founded in 2005 and has lately grown very rapidly and profitably. Siili is offering Digital Service creation and demanding information mgmt system integrations to various business fields like public sector, finance, media and industry. Siili assists its customers to define, develop and implement the most value creative digital service and software solution to their information systems, technology agnostically.

Finance corporation (Case 1) is one of the leadings in the Finnish financial sector, employing several thousands employees around of the country. It was founded more than 100 years ago, and has been able to renew itself after significant changes in Finnish macro economical situation, and after numerous mergers. This corporation is well aware of the ongoing Digital Revolution in its business sector, and has done continuous development for safeguarding its ongoing business and gaining its portion from the new digitized financial services.

Insurance company (Case 2) is one of Finland's most respected wealth management and insurance services provider, having hundreds of thousands private customers and tens of thousands corporate customers.

4.2. Case 1

Siili has been approaching this Corporation since 2011. Two first attempts were not successful, but after learning the value creative approach, Siili got the customer engaged to the value co-creation 2014. All three attempts are described below, only the last, successful one is described also at the cognition and behaviour levels.

4.2.1. Round 1 (2012)

Emotion Onstage; Siili was approaching this corporation already in 2011, when they were reorganizing their internal Enterprise software system (ESWS) development for increasing the operational efficiency. Siili was introduced to the highest technical level in the organization, using reputable references and SW architectural expertise in convincing its capability to challenge the existing suppliers. **Emotion Backstage;** Siili was seeing a co-creative value creation opportunity with Agile SW Development, and offered its services as the complementary for the existing suppliers. **Emotion Support ;** Customer was giving Siili an opportunity to challenge the existing supplier in standalone Digital Service creation. Even if Siili made a winning offer, it never entered to the Execution as the top management didn't see Siili as a strategic supplier.

4.2.2. Round 2 (2013)

Emotion Onstage; Siili was continuing the collaboration, and gained new interest in the top technology management. **Emotion Backstage;** Siili found a sound opportunity in the interface between the new Digital Services and Legacy ESS. **Emotion Support;** Siili offered an innovative interfacing solution which was finalised in the co-creational service design iteration together with the customer, but because the involved customer liaison was too narrow, it never led to the execution.

4.2.3. Round 3 (2014)

Emotion Onstage; Siili was getting stronger with an organic growth and a few acquisition, continuing the collaboration, and gained new interest from the top management. At this time there was wide presence from business, technology and marketing organizations listening the introduction. **Emotion Backstage;** Siili was listening customer need, understood customer organizational dependencies, and tailored its liaison meeting exactly customer expectations for the co-creative relationship. **Emotion Support;** Siili offered a lean startup – based approach for rapid digital service creation. The team was having interfaces to Business and Technology organizations.

Cognition Onstage; Siili was beginning with the rapid prototyping of possible new services. **Cognition Backstage;** When concept was proven, Siili offered not only the creation of service, but also integration to existing ESWS. **Cognition Support;** With the cross functional team from service creation to design, development, integration and information management Siili was proving its capability to support customer's value creation to all organizational entities (business, technology & excellence).

Behaviour Onstage; Relationship was beginning from the small amount of trust and small proof of concepting, but is growing steadily and now this customer is one of the 10 biggest of Siili's. **Behaviour Backstage;** Siili is now well known within the top mgmt, and Siili's liaison interface is growing steadily. Access to the mgmt team is giving Siili an opportunity to plan team member selections (required competencies) based on customer's strategy based expectations. **Behaviour Support;** Siili is learning continuously more about customer's business environment, expectations, technologies and way to work. At the same time customer is learning how to make iterative service creation effectively. Especially understanding architecture in many levels (business, information, enterprise) is enabling Siili to continuously increase its value in customer's value creation process.

4.3. Case 2

Siili has been approaching this Company since 2011. The relationship has been growing from resource provider to the co-creative trusted digital service creation adviser. First two rounds are presented only on the emotional and cognitional level, but the third one is truly co-creative and therefore presented also on the behavioural level.

4.3.1. Round 1 (2012)

Emotion Onstage; Siili was approaching this Company already in 2011. First introduction was done to the top mgmt level, where Siili was directed to Technology organization. **Emotion Backstage;** Siili was seeing a co-creative value creation opportunity with Agile SW Development, and offered its services as the complementary for the existing suppliers. **Emotion Support;** Customer was giving Siili an opportunity to challenge the existing supplier in technology agnostic sw service development.

Cognition Onstage; Siili was seen as a resource provider, not given a real opportunity for service innovations. **Cognition Backstage;** Siili was providing strong sw development competency to the customer's team. **Cognition Support;** Siili offered support technology agnostically and transparently.

Behaviour Onstage; Invoicing was purely time and material based, and volatility was following customer's needs and budgets. **Behaviour Backstage;** Siili was exploring opportunities to gain trust in the top management, and learned more customer's business and value creation. **Behaviour Support;** Siili was providing some add-on services like Agile coaching and problem solving, which was leading us to the next iteration.

4.3.2. Round 2 (2013)

Emotion Onstage; Siili was continuing the collaboration, and gained new interest in the top technology management. **Emotion Backstage;** Siili found a sound opportunity in providing remote working team flexibly and cost effectively for supporting customer's urgent needs in the middle of budgeting session. **Emotion Support;** Siili was growing and acquiring more competence especially in digital service creation.

Cognition Onstage; Siili's business model was seen trustworthy and transparent. **Cognition Backstage;** Siili was maintaining the high level of competency with the remote team, and flexibility with the local on-site support. **Cognition Support;** Siili was still seen tightly as a sw system developer.

Behaviour Onstage; Business relationship was seen continuous, even if invoicing was following customer's needs and budgets there was some invoicing baseline always continuing. **Behaviour Backstage;** Siili was exploring opportunities to gain trust in the top business and marketing management, and learned more customer's business and value creation. **Behaviour Support;** Siili was offering some small digital service innovations, which was leading us to the next iteration.

4.3.3. Round 3 (2014)

Emotion Onstage; Siili was getting stronger with an organic growth and a few acquisition, continuing the collaboration, and gained new interest from the top management. At this time there was presence from business, technology and marketing organizations. **Emotion Backstage;** Siili was listening customer need, understood customer organizational dependencies, and tailored its liaison to meet exactly customer expectations for the co-creative relationship. **Emotion Support;** Siili offered a lean startup – based approach for rapid digital service creation. The team was having interfaces to Business and Technology organizations.

Cognition Onstage; Siili was beginning with the rapid prototyping of possible new services. **Cognition Backstage;** Siili offered not only the creation of service, but also integration to existing ESWS. **Cognition Support;** With the cross functional team from service creation to design, development, integration and information management Siili was proving its capability to support customer's value creation to all organizational entities (business, technology & excellence).

Behaviour Onstage; Relationship was beginning from the small amount of trust and small proof of concepting, but is growing steadily and now this customer is one of the 10 biggest of Siili's. **Behaviour Backstage;** Siili is now well known within the top mgmt. Access to the mgmt team is giving Siili an opportunity to plan team member selections (required competencies) based on customer's strategy based expectations. **Behaviour Support;** Siili is learning continuously more about customer's business environment, expectations, technologies and way to work. At the same time customer is learning how to make iterative service creation effectively. Especially understanding architecture in many levels (business, information, enterprise) is enabling Siili to continuously increase its value in customer's value creation process.

5. Discussion – A Cross Organizational Approach for value co-creation

In service co-creation the Supplier processes are seen as a value stream, where core competences are the value particles, and suppliers' efficiency can be measured with value density (level of competency), and value stream density (optimizing utilization rate of value creating actions) based on Lean thinking. Ries (2011). created so called Lean Startup – framework for Lean encountering, which we have explored, proved working in our business environment, and integrated as a part of our encountering framework.

Business, Technology and Excellence (Emotional, Efficiency, Operational or Development) organizations are getting together in service related decision making, and therefore it is important to understand how strong the liaison is, and how the relationship can be leveraged and strengthened (figure 4). We would like to see this encountering to be tested in strategic, tactical and operational service offering, and in different business verticals.

In this process we have realized that cross organizational approach for value co-creation requires cultural backbone for common entrepreneurial customer service, and lean organization where people are respected and authorized for value creation. Personnel represent core competences, which in a service society are the base of exchange. Good employee experience is the foundation for good customer experience, which enables profitable growth. Employee commitment is the foundation for growth, and employee development is leading to the development of the company. The company's development creates the basis for a sustainable business, which creates trust among employees and customers.



Figure 4. Cross organizational value co-creation.

6. Conclusion

We conducted Action Design Research in a professional service environment in 2011-2015. The findings developed our understanding of this topic from the productization of services through servitization to Service dominant logic, its encountering, and finally to the Lean thinking and delivery process.

This research started in Finland in 2011 when a professional service provider company was looking for a unique competitive advantage and the first author was inspired by theories of Service-Dominant logic and Lean Thinking. The goal was to create an innovative service offering with supporting organizational structure and management and there have been several iterations by the publication of this paper in 2015. Original approach was based on productized service solutions and value propositions in 2011. However, the market environment, (consisting of the 300 biggest corporations in Finland) evolved towards product and technology agnostic software system integration. On this path during five years we have studied theory and practice (Learn), built an offering with organic and inorganic expertise development (Build), and measured constantly results for navigating towards right decisions with minimum amount of wasted resources (Measure). We found Service-dominant logic through Servitization theory, and have used it as a framework for our service innovation, creation and delivery processes.

Digitalization is feeding globalization, dismantling the industrialization driven business, management, and marketing logics. Industrial revolution was done for creating efficiency in scale, whereas Digital revolution is creating creativity in scale. Individual service creation is returning respect to craftsmanship, service innovation, and co-creative value creation. Service is the focus of economic exchange. Rapid and agile business development is required for responding to the change, no firm can create sustainable competitive advantage. Value creation is the baseline in service economy, and value is always defined by beneficiary. When offering is based on value

creation, the value stream is a measure for efficiency. This is how Lean thinking and Service dominant logic are clearly connected.

We believe that Service-dominant logic is a great foundational framework for understanding value creation in digital age, where service is the fundamental basis of exchange, and products only vehicles for service delivery. In digital economy supplier has to be able to provide real value to its customer, for understanding the value definition supplier has to be able to transparently collaborate and co-create the value offering. After that Supplier has to be able to provide fluent value stream, avoiding activities which don't create value. Service- and business development has to be iterative for being able to respond to the changes in business environment.

In this article we introduced Lean SDL Encountering Process as well as Cross Organizational value co-creation approach. We offer a broadened view to Service dominant logic, some of the latest Service marketing studies, and Lean thinking. Moreover, we connect these together for being able to explore value definition, value stream, and especially Encounter between the supplier and customer in service innovation, creation and delivery.

In summary we do believe, that the results of this study could help numerous organizations understanding the need for transparency and pull steered value co-creation in their business development process. We proved usefulness of these frameworks at least for the case organization with our empirical results. Our aim is to get deeper in details in the upcoming studies.

Kasanen et al. (1993) introduced the concept of market-based validation for constructive research. The research described in this paper fulfills the criteria of "weak market test" meaning that management of a single company has applied this construction and appreciates the usefulness. We encourage other researchers and practitioners to apply the same frameworks and constructions in other companies in order gain more scientific evidence. This would fulfill the requirements of semi-strong market test if the constructs would become widely adopted. In addition, the case company has profitably increased sales revenue and employee headcount as well as the stock market value during the research period, which also indicates that the strategic R&D initiative has been successful.

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A3: Bricolage and user-based innovation in manual services

Chair: Mervi Hasu

USER INVOLVEMENT AND SUPPORTING TOOLS IN BUSINESS-TO-BUSINESS SERVICE INNOVATIONS: INSIGHTS FROM FACILITY MANAGEMENT SERVICES

Abstract

Purpose – This article investigates and conceptualizes user involvement in business-to-business service innovations as well as the tools that are used to support interactions in such a service innovation process.

Design/methodology/approach – The paper uses a qualitative research approach to answer the research question. By following Miles and Huberman (1984)'s this study started with a literature review of studies investigating service innovation, service innovations models, user roles and tools in service innovation in general, to conduct an empirical investigation in facility management (FM) services.

Findings – The findings indicate that, in business-to-business services such as FM services, the involvement of users is variable depending on the offered services as well as on the specific role that users play with regards to the service being innovated since users might have different needs and expectations with respect to such service innovation. In addition the study reveals that face-to-face tools are preferred to ICT-based tools in business-to-business FM service innovations.

Research limitations/implications – As in all qualitative research, the main limitation of our study is the generalizability of the findings to other business-to-business service sectors. More research conducted both in FM services and other service sectors would help to shed light on the generalizability of these findings.

Originality/value – The study contributes with new and detailed insights into the complexity of user involvement and supporting tools in business-to-business service innovations.

Paper type: Research Paper

Keywords: business-to-business services, service innovation, customer involvement, user roles, tools for customer involvement, facility management services, Information and Communication Technology.

Introduction

The service sector is an important economic sector of our society, employing about 70 % of the work force in most developed economies, and often characterized by complex service systems. A type of service that has developed over the last twenty years is Facility Management (FM) services. FM services are here defined as a diverse set of support services, which aim at enabling organizations to pursue the objectives and goals of their core business (Alexander 1992). Examples include building maintenance, catering, but also Information Technology (IT) services and cleaning. FM services, due to their supportive nature and to the fact that they are often outsourced to external providers, can be described as complex business-to-business service systems. They are in fact characterized by a complex value network, which includes top management, internal FM unit and employees of the client organization, along with the outsourced providers.

Facility management services require radical and incremental innovation not only to succeed and compete in the hectic contemporary markets, but also to affirm their increasingly importance within organizations (Goyal & Pitt 2007; Lindkvist & Elmualim 2010; Mudrak et al. 2005). However, the complex value network of FM services makes it difficult for internal and external providers to manage innovation processes, as heterogeneous needs and expectations require coordination among different innovation actors when planning and implementing FM service innovations. At the same time, it also implies that diverse internal and external actors get involved to various degrees throughout the FM service innovation process. This makes it particularly interesting to study innovation processes and, more specifically, user involvement in the innovation process of business-to-business FM services. Martin, Horne, and Schultz (1999) highlight that a major impediment to developing a business-to-business service innovation is understanding and adjusting to the change in role played by the client in a service dominant offering, as opposed to the role for one of product dominance. By drawing on Norman (1984) Martin et al. (1999) also emphasize that “the complexity is highlighted by the client playing two roles: that of the customer and that of a co-producer of the offering. In other words, clients not only receive and consume the service offering, but also serve as participants in its innovation, production, and delivery” (Martin et al. 1999:1). Such complexity of business-to-business services is further accentuated in FM services given the multiplicity of actors involved in the FM service system.

Kindstrom and Kowalkowski (2014) in point out that in business and industrial marketing, innovation research continues to focus mostly on products (e.g., Hsu 2011; Lettl & Gemünden 2005; Munksgaard & Freytag 2011), although some articles dealing with service innovation are getting published (e.g., Alam & Perry 2002; Nicolajsen & Scupola 2011). Nevertheless, Kindstrom and Kowalkowski (2014) suggest that B2B firms must embrace a broader perspective on innovation, moving beyond traditional product-centric views (e.g., Garcia & Calantone 2002). Given this background, the purpose of this article is to contribute to the literature on service innovation in a business to business context by: (1) conceptualizing and investigating user involvement in service innovation processes of business-to-business FM services and (2) mapping a number of tools, which support interactions in such a service innovation process. Therefore, the research question addressed in this paper is:

How can users be involved in the different stages of the innovation processes of business-to-business services such as FM services and what kind of tools can be used to support such an innovation process?

To answer the research question, the paper draws on literature on new service development and service innovation; literature on customer roles in new product and service development; and literature on tools for customer involvement to conduct an empirical investigation of user involvement in the business-to-business FM service field. Data collected in several FM organizations were used to answer the research question of the study.

The paper is structured as follows. The introduction presents the background, and the research question of the study. The second section introduces the empirical setting, while the third section outlines the theoretical background. The fourth section presents the research method. This is followed by the analysis of findings. Finally, the last sections provide a discussion of results and the concluding remarks.

Empirical setting: FM services and FM innovation

In the last three decades, FM has established itself as a key service sector, with a diverse and highly competitive market of FM contractors, in-house teams, FM providers, FM consultants, and professional FM institutions (Cardellino & Finch 2006) that form complex FM supply chains (Nutt 2000). Coenen, Alexander, and Kok (2013) states that the provision of one or more FM services is usually outsourced to one or more external FM providers. The outsourced FM providers collaborate with the internal FM unit of the client organization to ensure the proper functioning of the organization as a whole, by providing FM services to the employees, i.e. the end-users. Table 1 below provides a description of the different actors and their role in the FM services outsourcing set up.

Table 1: Stakeholders and stakeholder roles in the FM value chain.

FM Service Stakeholder	Role	Explanation
Organization, represented by the top management	Client	Orders to the internal FM unit the services to support carrying out the core business.
Internal FM unit	Double role of Customer and Internal Provider	Buys the services from the outsourced provider (in the role of customer) and/or provides services in-house to make sure that the organization can carry out the core business (in the role of internal provider).
Employees	End-users	Actually receive and consume the services while carrying out the core business of the "Organization".
Outsourced provider(s)	Provider(s)	Provide the services that allow the organization to function, by negotiating with the internal FM unit to serve the employees in the role of end-users

Borrowing the terminology from the marketing literature, in FM services the organization as a whole plays the role of the client, which, to properly function and carry out its core business, orders the service to the internal FM unit. The internal FM unit plays (1) the role of the internal FM provider from the perspectives of the client organization and end-users; (2) the role of the customer from the perspective of the outsourced FM provider, with whom it negotiates the terms of the FM service provision. The end users are the employees of the client organizations, i.e. the individuals that are provided the actual FM services.

FM services are combined in specific and ad hoc bundles of tasks, activities and services depending on the market and context in which the client organization operates. Due to their supportive nature, FM services have mostly been characterized as a secondary activity within organizations, and have been paid attention only in connection with the core businesses of the entities they support. However, FM organizations have often demonstrated the dedication and drive to implement new service development and exceed customer expectations, while adding value to the core business of the client organization (Pitt & Tucker 2008; Mudrak et al. 2005). Previous research has shown that FM organizations continuously manage innovation as a process and tend to have several projects under development at the same time (Mudrak et al. 2005; Cardellino & Finch 2006). However, they lack the ability to establish progressive innovation routines that would enable a successful innovation management. It can be concluded therefore that in addition to the complexity evidenced by Martin et al. (1999) in business to business service innovation in general, FM service innovation is further characterized by the need for cooperation between the different actors of the FM service system and the different roles played by top management and employees, along with the double role of the internal FM unit in the service innovation process (Coenen et al. 2013).

Theoretical background

Understanding services and service innovation

According to Bitner, Ostrom, and Morgan (2008) one of the most distinctive characteristics of services is their process nature. Unlike tangible goods, services are dynamic and unfold over a period of time through a sequence or constellation of events and steps. Moreover, services often require face-to-face interaction between the provider and the consumer as production and consumption often take place simultaneously. Although such simultaneity is not always true, services are perishable and cannot be stored, and their consumption usually starts right after production (Sundbo 1997; den Hertog 2010). The service innovation process has been defined as the process through which an idea for a new service, or for the renewal of an existing service, is developed and carried into practice to offer added value to the customer and provide benefit to the provider. To be classified as an innovation, the new service or the service renewal must not only impact the developer but involve elements that allow reproduction in different contexts (Sundbo 1997). There are several terms used in the literature to address the way new services are developed. New service development and systematic service innovation deal with the overall process of developing new services and are concerned with the complete set of steps from idea generation to commercialization of the service, even though some literature on service innovation only focuses on the idea generation phase.

In this article, the terms service innovation and new service development will be used interchangeably. In addition, for the purposes of this study, service innovations are defined according to the three Schumpeterian criteria, adapted to FM service innovation: (1) FM innovation is an idea, which is developed and carried into practice; (2) FM innovation brings benefits to its developer; and (3) FM innovation is reproducible, i.e. applied more than once (Toivonen & Tuominen 2009; Sundbo 1997). Not only new-to-the-world FM services are included in this study, but also new-to-the-firm (new-to-the-client) FM services, as (1) FM services are commonly adapted according to the characteristics of the client and thus require innovation management at the client side, but at the same time – in big organizations such as the ones involved in this investigation – new and improved services are reproduced across different FM services and areas of the organization, and therefore classifiable as innovation; (2) even when only new-to-the-firm, the new FM services originate organizational change processes in the customer FM unit and client (Nardelli 2013).

Customer involvement in service innovation and tools for involvement

Whether service innovation processes are planned, or happen ad hoc (Gallouj & Weinstein 1997) the involvement of users is increasingly being recognized as potentially supporting of a successful innovation outcome. Service innovation literature has highlighted how the proactive and systematic involvement of users in new service development processes, if managed correctly, is able to support such development and implementation of ideas (Alam & Perry 2002; Alam 2002; Matthing et al. 2004; Magnusson et al. 2003; Nicolajsen & Scupola 2012; Scupola & Nicolajsen 2010). Customer involvement, in fact, is expected to provide a more complete and accurate list of customer needs, behavior, changing requirements, and deep-seated dissatisfactions with current alternatives, and therefore contribute and improve service innovation. In this study, customer involvement in FM service

development is defined as those processes and interactions where a development team collaborates with current (or potential) customers at strategic, tactic or operational level to uncover information such as latent needs, develop customer knowledge, and develop new services accordingly.

The literature on customer involvement has focused on the evolution and transformation of the customer from a passive subject to being an active player in the innovation process and the different roles that the customer can take in this evolution. Such roles have been characterized among others as collaborators, co-developers, competitors (Prahalad & Ramaswamy 2000). Table 2 below provides an overview of customer roles in service innovation.

Table 2: An overview of customer roles in service innovation.

Study	Customer Roles
Nambisan (2002)	User as <i>resource</i> ; User as <i>user</i> ; User as <i>co-creator</i> .
Blazevic, V., & Lievens, A. (2008)	Customers as <i>passive users</i> ; Customers as <i>active informers</i> ; Customers as <i>bidirectional creators</i> .
Enkel et al. (2005)	<i>Requesting customers</i> provide ideas for new products, often by means of complaints and suggestions. As complaints are based on current products, new product information is rather limited; <i>Launching customers</i> are integrated from the development phase to participate in development activities; <i>Reference customers</i> supply application experience from prototype testing; <i>First customers</i> enter the development process in the late phases of pre-announcement and market launch; <i>Lead users</i> could cover all stages of the NPD process.
Michel et al.(2008) in Kowalkowski (2011)	<i>Users</i> whose role primarily relates to value-in-use; <i>Payers</i> whose role primarily relates to value-in-exchange; <i>Buyers</i> whose role bridges value-in-use and value-in-exchange.
Von Hippel (1986)	<i>Lead users</i> .

Organizations use diverse tools to systematically involve users in service innovation processes, which have been discussed in existing literature (e.g., Prandelli, Verona, & Raccagni 2006). Face-to-face interactions in the form of, for example, workshops, focus groups, user visits and meetings have been found very important to successfully involve users in the service innovation process (e.g., Alam 2002; Magnusson et al. 2003; Matthing et al. 2004). However, ICT-based tools are increasingly gaining importance thanks to their ability to capture and store data and to their independence from geographical location. Prandelli et al. (2006) have, for instance, identified 28 different web-based tools that can be used in the different stages of product innovation. These web-based tools range from surveys and ‘complaint areas’ used in the idea generation phase to ‘virtual product tests’ in the product test phase. In addition, Prandelli et al. (2006) found that the web-based tools are mainly used by larger corporations in the first and last stages of the innovation process, and are mainly considered as substitutes for offline practices.

The Conceptual Framework

To investigate how customers are involved in the service innovation process of business-to-business FM services, this study draws on the service innovation model developed by Alam and Perry (2002); the customer roles in the innovation process developed by Nambisan (2002) and a taxonomy of tools for user involvement in service

innovation developed by Scupola and Nicolajsen (2013). Alam and Perry (2002) presented a 10-stage model of the service innovation process, including: (1) Strategic planning; (2) Idea generation; (3) Idea screening; (4) Business analysis; (5) Formation of cross-functional team; (6) Service and process design; (7) Personnel training; (8) Service testing and pilot run; (9) Test marketing; (10) Commercialization (see the first column in table 3), and discussed user involvement in each of the stages. Alam and Perry (2002)'s contribution takes into account the core element of user involvement in service innovation and highlights the objectives, purposes, stages, intensity and modes of user involvement in new service development. Alam and Perry (2002)'s study is therefore useful to build the framework to investigate the heterogeneous user roles in the FM service innovation.

Nambisan (2002), on the other hand, has conceptualized three roles that can be played by customers in new product development: (1) customer as a resource; (2) customer as co-creator; (3) customer as user. Such roles have been previously applied to the context of business-to-business service innovation (Nicolajsen & Scupola 2011), and are here explained in relation to the NSD model by Alam and Perry (2002). Firstly, the contribution of customer as a resource is variable, and depends on the alignment of offered services with the customer base. One possible argument is that the more the provided services are aligned with the customer needs and expectations, the less the customers will actually contribute to the service innovation process, which will make the ideas generated by such role more incremental than radical. When playing the role as a resource, customers are usually passive: it is the provider that needs to find out about customers' opinions, needs and expectations through, for example, surveys or focus groups. Secondly, customers can be involved as co-creators, and thus participate in various activities, from design to development of the new service. Customer-firm interactions in this type of involvement tend to be more intense and frequent, and the support mechanisms for such interactions are expensive, time consuming and technology intensive. Finally, customers can play the role of users through service testing and service support. When involved as users, customers test the service and provide feedback based on their experience, which allows the service innovators to improve their offering when reproducing the service innovation.

Scupola and Nicolajsen (2013) have developed a taxonomy of tools to involve users in service innovations. They have distinguished such tools into direct vs. indirect and face-to-face vs. ICT-based. The direct tools (both face-to-face and ICT-based) such as workshops and online idea competitions require a direct and pro-active involvement from the users in the innovation process. The indirect tools such as ethnographic studies and virtual communities, on the other hand, require a more passive role, meaning that the users are mainly observed from outside actors to gain insights into their needs and expectations in relation to the service innovation process.

Table 3: Conceptual framework.

10 stages of new service development (Alam and Perry 2002)	Customer's roles in New Product Development (Nambisan 2002)	Tools for customer involvement (Scupola and Nicolajsen 2013)
a) Strategic planning;	Customer as resource;	Direct face-to-face tools
b) Idea generation;	Customer as co-creator;	Direct ICT-based tools
c) Idea screening;	Customer as user.	Indirect Face-to-face tools
d) Business analysis;		Indirect ICT-based tools
e) Formation of cross functional team;		
f) Service and process design;		
g) Personnel training;		
h) Service testing and pilot run;		

-
- i) Test marketing;
 - j) Commercialization.
-

Research method

To answer the research question, a qualitative research method has been chosen because qualitative data “are the source of well-grounded, rich description and explanations of processes [...] and help researchers go beyond initial pre-conceptions and frameworks” (Miles & Huberman 198:15). By following Miles and Huberman (1984)’s guidelines for conducting qualitative research, this study started with a literature review of studies investigating service innovation, service innovations models, user roles and tools in service innovation in general, which was followed by an empirical investigation in the FM field.

Data for the study were gathered from archival sources, interviews with companies as well as attendance in practitioner conferences and workshops on the topic of innovation in business-to-business FM services. In all, 19 explorative, semi-structured interviews with facility managers working in internal FM units and outsourced providers were carried out in 15 Danish companies (Table 4). Furthermore four in-depth interviews were carried out in two of the companies involved in the study, and aimed at gathering more details and examples of the innovation processes that were spotted during the initial explorative round of interviews. The themes of the interviews included company and respondent background, the management of FM service innovation and new service development in general, and, more specifically, the structure and characteristics of interaction among stakeholders, the features and impact of user involvement in service innovation, and the tools (face-to-face and ICT-based) that are used to support processes of FM service innovation.

Table 4: Companies and interviewees involved in the study.

Company code	Role of company with respect to FM services	Core business	# employees	Position of interviewees
1	Client	Financial services	32500	Head of Contract Management & IFM Development
2	Client	Logistics	n.a.	Global Facility Management
3	Provider	Cleaning	300	CEO
4	Client	IT services	98000	Facility Manager
5	Research group	Research group	n.a.	Expert
6	Provider	Hard FM services	8000	Market Manager
7	Client	IT services	430000	Real Estate Site Operations Manager
8	Consultant/provider	Consulting	6200	Senior Project Manager
9	Client	Industrial biotech	5500	FM Director
				FM Manager
				FM Project Director
10	Provider	FM services	534500	Head of Knowledge Sharing and Engagement
				Commercial Director and CFO
				Director of Business Development
				Segment Director

11	Provider	Real estate	370	Head of Operations
12	Provider	Technical FM	162000	Nordic Head of Projects Regional Director Projects Nordics
13	Client	Transport	5500	Facilities Manager Group Procurement Manager
14	Client	Telecom equipment	7500	Global Head of Facility Management
15	Provider	FM services	7000	Director of Business Development

The interviewees were selected with a combination of convenience (at the beginning) and snowball (later on) sampling criteria (Eisenhardt 1989). All interviews were tape-recorded and transcribed, and notes were taken both during and after the interviews. To increase reliability, an interview protocol was used and a database was developed (Yin 2009). The respondents, all senior managers or directors, were somehow involved with FM innovation within their organizations.

To complement the interview data and ensure triangulation (Eisenhardt 1989; Yin 2009), archival data, i.e. reports, power point presentations, emails, newsletters, corporate brochures, were collected both from the interviewees and from secondary sources, such as corporate websites and during conferences, and were analyzed along with the interview data through subsequent steps of open and axial coding. The collected data were analyzed deductively by using the conceptual framework based on Alam and Perry (2002), Nambisan (2002) and Scupola and Nicolajsen (2013), with the support of the qualitative data analysis software Atlas.ti.

The setting in which we investigate user involvement is the business-to-business FM setting constituted by the relationship between the client organization and the outsourced FM service provider. Specifically, the data were analyzed from the perspective of the outsourced provider and the internal FM unit, which, within the FM service context, has the double role of being the customer (of the outsourced service provider) and the internal provider of the client organization. Therefore, when investigating user involvement in FM service innovation processes, it is interesting to look at how the internal FM unit (a) is involved as customer in relation to the outsourced FM provider; (b) involves top management and employees when developing new services together with the outsourced provider.

Analysis and results

This study aims at understanding user involvement in business-to-business FM innovation processes in the setting of the client organization and the outsourced FM service provider. The perspective of the providers is taken to investigate which different user roles the stakeholders of the client organization, i.e. the users, play in the service innovation process. As explained above, within FM services two main stakeholders are to be considered as providers: the outsourced FM providers and the internal FM unit. Therefore, in FM services, innovation processes can be carried out by (a) the outsourced provider or (b) the internal FM unit individually, but also (c) in collaboration between the two parties. Given the focus of this investigation, the innovation processes considered in the data analysis are only those that were carried out in collaboration between the outsourced provider and the internal FM unit. The analysis shows that these service innovation processes can be initiated for different reasons, e.g., the contract obligations of the outsourced providers and/or the direct requests of internal FM units, and the

different actors take on different users roles (as defined by Nambisan 2002) with various degrees during the innovation process.

The data indicate, in fact, that the client organization (the one outsourcing the services to the external FM provider), the internal FM unit and the employees, i.e. the users, play the roles of resource and co-creator –although heterogeneously and to a various degree – throughout the new service development process, and up until the stage of service testing and pilot run. In the final two stages of the service innovation process (Test marketing and Commercialization), on the contrary, the study finds that the client organization, the internal FM unit and the employees are passively involved as users, if involved at all.

The next sub-sections will more in-depth present the results of the study, summarized in Table 5 according to (1) stages of the service innovation process (Alam & Perry 2002); (2) stakeholders of the FM service innovation; (3) user roles (Nambisan 2002); (4) supporting tools.

User involvement and user roles in FM service innovation processes

In FM services, the organization (client) as a whole, internal FM units and end-users of the client organization represent diverse sets of users each of which may play different roles in FM service innovation processes. Our analysis indicates that the internal FM unit cooperates with outsourced providers in most phases of the innovation process, and takes on the different roles of user, resource or co-creator. Top management and end-users of the client organization, on the other hand, mainly participate in innovation processes as user and resource, but on different levels. Top management is often involved by the internal FM unit to support and legitimate strategic decision-making, e.g., during the strategic planning and the business analysis stages of the FM service innovation process. End-users, conversely, are usually more or less directly involved in the more operational phases of the innovation process, such as idea generation and personnel training.

The stages of the new service development, during which strategic decision making takes place (e.g., strategic planning and business analysis) are those in which the most direct user involvement (as resource and co-creator) tends to be required, especially from the internal FM unit and the top management, who represents the interests of the client organization as a whole. Strategic decisions, such as the ones taken along the strategic planning or business analysis stages of the new service development, require the direct involvement of the top management, along with that of the FM unit, especially when significant investments and efforts are related to the service innovation. For example when the internal FM unit of company 1 (FM client) has decided to initiate an Integrated FM (IFM) project, they have done the strategic planning before going out and looking for suppliers, and have done so by constantly referring to and involving top management in decision making.

Moreover, regularly scheduled meetings are usually organized between the internal FM unit and top management to discuss the strategic development of the organization as a whole and the consequent adaptation needs of FM. The internal FM unit is then in charge of integrating all strategic considerations in the innovation processes developed by the outsourced providers. In case of sudden instance, e.g., a crisis, meetings between the internal FM unit and top management can also be called ad hoc, to discuss potential consequences and responsive counter-actions. In company 9 (FM client), for instance, top management has asked the internal FM unit to find a solution to reduce travelling costs for the organization (top management involved as co-creator). This resulted in a

shared strategic planning between the top management and the internal FM unit, who then took over the innovation process along with the outsourced provider.

The internal FM unit, gets directly and indirectly involved throughout most stages of the innovation process, not only as resource, but also, and even more, as co-creator. For instance, when the innovation process in question does not strategically and/or financially concern the organization as a whole, e.g., in the case of single service innovations, it is the internal FM unit that carries out the strategic planning of innovation processes. In such cases, the internal FM unit either influences the outsourced providers indirectly by setting the guidelines (involvement of the internal FM unit as resource) or works on the strategic planning and on its implementation together with the outsourced providers (involvement of the internal FM unit as co-creator).

On the contrary, operational stages such as idea generation and screening, among others, are left to the providers, unless the innovation process has a peculiar relevance for the client organization. In company 2, for example, an FM client stated how external providers should be in charge of the operational tasks of the innovation process, and especially idea generation, while the internal FM unit would rather be involved in the idea selection to make sure all needs and expectations of the end-users are taken into consideration. Innovation is, in fact, usually one of the activities, which the outsourced provider is expected by contract to carry out. The internal FM unit is thus not always keen on being directly involved in the operational phases. Therefore, the outsourced provider is usually in charge of the idea generation and the subsequent management of the innovation process.

The internal FM unit, however, may decide to be involved in operational activities for the new service development process either because of a specific interest in the upcoming project, or of a proactive entrepreneurial drive. The internal FM unit has two options for involvement in the innovation processes, initiated by the outsourced providers. It can either decide to be directly involved, by sharing ideas with the outsourced providers (co-creator); or send out idea competitions to their end-users to collect ideas, whose outcomes will then be shared with the outsourced providers. In the latter case, the involvement would be as intermediary, while the end-user would be involved as resource.

End-users, finally, tend not to be involved in the strategic decisions, as their heterogeneous needs are believed to (a) not correspond to those of the organization and (b) often be too operational. Their involvement would thus be too complex and resource consuming. Nevertheless, end-users seem to be involved, as resource and, most of all, as users, in various phases of new service development processes. Such involvement takes place through the intermediate action of the internal FM unit and/or the outsourced provider, which may decide to use ICT-based tools, e.g., email or Intranet, to distribute idea competitions and user surveys. In alternative, this may take place with face-to-face interviews, workshops and workgroups in the initial stages (idea generation and screening); and shared training and team building in the latter ones (formation of cross-functional teams and personnel training). For instance, company 14 (FM client) requires its providers to regularly distribute user surveys to ensure a specific level of user satisfaction, while company 10 (FM outsourced provider) carried out interviews with end-users to delineate their needs and expectations to generate ideas. The aim of such initiatives combines (a) collecting feedback on existing services to better match needs and expectations in the innovated ones; (b) asking for potential ideas for improvements and innovation; (c) build awareness on the activities of the FM unit. In addition, ideas and feedback

are continuously collected per email and/or customer relationship management tools. End-users use the ICT tools to submit their feedback and proactive ideas to the internal FM unit, which operates as filter, and pre-selects the ideas to submit to the outsourced provider for screening and, potentially, development.

Table 5: Summary of findings.

Stages of the service innovation process	Stakeholders of FM service innovation	User roles as defined by Nambisan (2002)	Supporting tools
a) Strategic planning	Organization outsourcing FM services (FM Client)	Resource; Co-creator	Regular and ad hoc meetings; workshops
	Internal FM unit of Organization outsourcing FM services (FM Customer)	Resource; Co-creator	Workshops; trust-based relationships
	Employees of Organization outsourcing FM services (FM End-user)	Resource	User-surveys; interviews; workshops
b) Idea generation	Organization (FM Client)	Not involved	N.A.
	Internal FM unit (FM Customer)	Resource; Co-creator	Workshops; ICT for information management and sharing
	Employees (FM End-user)	Resource	Idea competitions w/ or /o ICT support; user surveys; workshops
c) Idea screening	Organization (FM Client)	Resource	Transparency matrices and models; workshops
	Internal FM unit (FM Customer)	Co-creator	Face-to-face meetings; ICT for information management and sharing
	Employees (FM End-user)	User	User surveys; user workgroups; workshops
d) Business analysis	Organization (FM Client)	Resource	Transparency matrices and models
	Internal FM unit (FM Customer)	Resource; Co-creator	Face-to-face meetings; ICT for information management and sharing
	Employees (FM End-user)	Not involved	N.A.
e) Formation of cross-functional team	Organization (FM Client)	Not involved	N.A.
	Internal FM unit (FM Customer)	Co-creator	Workshops; team building activities
	Employees (FM End-user)	Not involved	N.A.
f) Service and process design	Organization (FM Client)	Not involved	N.A.
	Internal FM unit (FM Customer)	Resource; Co-creator	Face-to-face meetings; ICT for information management and sharing; workshops
	Employees (FM End-user)	Not involved	N.A.
g) Personnel training	Organization (FM Client)	Not involved	N.A.
	Internal FM unit (FM Customer)	Co-creator	Workshops; shared training; team building activities
	Employees (FM End-user)	Co-creator	Workshops; shared training; team building activities
h) Service testing and	Organization (FM	Resource	Scenario analysis w/ or w/o

pilot run	Client)		IT-based simulation
	Internal FM unit (FM Customer)	Co-creator	Scenario analysis w/ or w/o IT-based simulation
	Employees (FM End-user)	User	User surveys
i) Test marketing	Organization (FM Client)	User	Ad hoc meetings
	Internal FM unit (FM Customer)	User	Workshops
	Employees (FM End-user)	User	User surveys
j) Commercialization	Organization (FM Client)	User	(observation by provider)
	Internal FM unit (FM Customer)	User	(observation by provider)
	Employees (FM End-user)	User	(observation by provider)

Tools for user involvement in the FM service innovation process

Based on the findings, table 6 synthesizes the support tools that are and can be used to facilitate user involvement in new service development within business-to-business FM services. The tools are classified in relation to the roles of the users and their involvement within FM service innovation processes.

Table 6: Classification of support tools in relation to user roles and involvement.

	User	Resource	Co-creator
Organization as a whole/Client	Ad hoc meetings	Transparency matrices and models Workshops Scenario analysis (with or without simulation IT)	Regular and ad hoc meetings Workshops
Internal FM unit/Customer	Workshops	Workshops Shared training Team buildings activities IT for information management and sharing	Workshops Face-to-face meetings ICT for information management and sharing Team building activities Scenario analysis (with or without simulation IT)
Employees/End-users	User-surveys User workgroups Workshops	User-surveys Face-to-face interviews Workshops Idea competitions Shared training Team-building activities	Shared training

Among the support tools workshops appear to be the preferred tool for most user roles and involvements. The interviewees have depicted workshops as useful support tools in heterogeneous situations, as they can be adapted in the structure and functioning to specific contexts and needs. For example, workshops organized with outsourced providers and internal FM units are used to involve the latter as users (e.g., in test marketing), as co-creator (e.g., personnel training), and as resource (e.g., business analysis).

Top management needs to be involved through less “requiring” tools, such as regularly organized and ad hoc meetings, facilitated through scenario analysis and transparency models. This seems to be due to the need to

demonstrate the value of FM services, along with the non-strategic focus that top management tends to attribute to FM services.

ICT-based tools are mostly used to support information sharing and management, and, in some cases (e.g., scenario analysis and transparency matrices), to facilitate communication between different sets of users (e.g., between internal FM unit and top management of the client organization). On the other hand, the importance of partnership-like relationships with the outsourced providers, based on trust between individuals, is mirrored in the relevance of face-to-face meetings, especially to support involvement as co-creators, not only of the internal FM unit, but also of top management and end-users.

Finally, end-user involvement appears to be supported mainly through ICT-based user-surveys and interviews, which allow collection of end-user perspectives without direct involvement (requiring more intermediating effort by the internal FM unit). Nonetheless, end-users are sometimes involved as co-creators through idea competitions and workshops, which not only support the new service development, but also increase awareness of FM within the organization. Shared training and team building activities facilitate direct involvement as resource and co-creators and allow opening the innovation process while getting closer to the actual needs of the end-users.

Discussion and conclusion

Given the peculiarity of FM services, it becomes important, when investigating FM service innovations, not only to look at the FM innovation process stages, as stated in the literature, but also to consider the different roles that different FM users might play when involved by the providers in such a FM innovation process. To investigate how FM service users can be involved with different roles through the FM new service development process, we have considered the user roles, i.e. resource, co-creator and user, presented by Nambisan (2002) in relation to the stages of the innovation process as described by Alam and Perry (2002). Furthermore, we have outlined the various tools, which FM organizations use to involve and engage the users in FM service innovation processes.

The results of the analysis indicate that, not only the involvement of users is variable depending on the offered services (Alam & Perry 2002), but also on the specific role that users play with regards to the service being innovated, when involved in FM service innovation processes. This is due to the peculiarity of FM services, where clients, customers and end-users do not represent a single typology of users, but rather have different needs and expectations with respect to the FM service innovation. These needs and expectations have to be matched and balanced for the service innovation to be successful, which is why the providers, who are in charge of FM service innovation, tend to involve different stakeholders in the same stage of the new service development process, but with different roles and variable degree of involvement. This implies that, for instance, customers, who buy the service, are involved as co-creator in the stages of new service development that require strategic decision making, to ensure a better match between the service innovation and the specific needs of the client, who orders the service, and the end-users, who finally receive the service. The client, represented in FM service systems by the top management of the organization ordering the services, is instead mostly involved as resource – to ensure a proper fit between the service innovation and the overall vision and mission of the organization. Finally, end-users are the least involved, called in as resource or user to ensure satisfaction, but without allocation of actual power in the new service development process. The data also indicate some trends in the use of face-to-face vs. ICT-based tools to

involve different types of users, and for different roles: the first are more common for user involvement as co-creators, while the latter support direct and indirect involvement as resource and user.

These results extend and contribute to the literature on service innovation and user roles by investigating user involvement in service innovation processes in complex services such as FM services, by highlighting which user involvement process might be followed, and which tools might be used to increase user satisfaction in the service innovation process. The study suggests that this might be achieved by involving different types of users in different stages of the service innovation process, with different roles and to a variable degree depending on what they can best contribute with, given their relation with the goal of the service innovation process. The focus on FM services depicts a setting, which was not addressed before in terms of user involvement in service innovation, but, and more interestingly, might be taken as an example for other business-to-business support services with complex value chain, such as IT services.

The theoretical implications of this study are linked to the importance of considering stakeholder roles when dealing with user involvement for business-to-business service innovation. This, in fact, might help to investigate user involvement in service innovation in more depth and details. For practitioners, on the other hand, this implies that, before involving users in service innovation, their role as clients, customers or end-users should be assessed to increase the potential of their contribution.

Nevertheless, this study also has limitations. Firstly, the focus on FM business-to-business service might limit the applicability of the results to other service contexts. Secondly, the data were collected among a relatively small amount of organizations in Denmark, which reduces the external validity of the study. Thirdly, theoretical models developed in business-to-consumer contexts were applied in a business-to-business FM context. To overcome the limitations, and increase the generalizability of these results, future research could for example replicate this study in other business-to-business services with multiple stakeholders. In addition, further studies could expand the focus to other aspects of service innovation, and look, for instance, at how the different stakeholders of complex service systems distribute and appropriate the value that is created through user involvement in new service development processes – and which tools can support such value appropriation.

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XXV. International RESER Conference: Employee critique as an impulse for bricolage in elderly care services

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This paper analyzes critique expressed by front-line care workers on their work conditions as a potential impulse for change and innovation-oriented agency. By analyzing interview accounts and interactions of elderly care employees in municipal nursing homes it is possible to achieve new understanding of how employee critique can advance employee-driven innovation. In the paper we analyze connections between employee critique and daily routines of employees in the context of elderly care services. We see employee critique as a neglected topic of research as well as opportunity to develop elderly care services and care work.

1. Introduction

"Employees has been involved in many changes at the work community. Sometimes the changes are accepted and occasionally refused. I can influence my team and its activities anyway." – Practical nurse Maria -

The Nordic countries are very 'aged' societies, and they are set to witness further population ageing, with respective economic challenges, in the future. For instance in Finland, it is estimated that the number of employees in the elder care sector will need to increase by 30 000 by 2030, leading to additional expenditure amounting to 1.2 Milliard euro (Kiander 2009).

In spite of the increasing automation and digitalisation of contemporary work in the western world, care work, performed mostly by women, especially in public services, is continuously carried out in real-life, day-to-day encounters between the care worker and the person being cared for (Szebehely, 2005; Martela, 2012). As the economic downturn continues and service needs increase, mainly due to demographic ageing in Europe, the production of care – and care work – becomes a critical and debated matter.

Alarming research results are being reported concerning care workers' working conditions, plans to leave care occupations, management support, and professional development. Interestingly enough, little attention is paid on 'manual' care work, care workers and work communities from the point of view of innovations, especially bottom-up innovation (e.g. incremental innovation, bricolage). The dynamics of transformative, employee-initiated critique or resistive actions are not systematically addressed in public administration and service research. There is a need for studies which could inform critically reflexive, practice-based and employee-driven interventions in elderly care.

Care work is one of the most demanding fields in the labour market, both physically and mentally (e.g. Trydegård, 2012). Care work is mentally arduous while relatives support has declined especially in Finland. Due to this unfortunate trend, care worker may be the only social contact for ageing person. Care work is physically heavy, because technical nursing devices are not available or cannot be used in all client rooms.

According to the research results one out of three care workers had seriously considered quitting their jobs (Trydegård, 2012). The study was conducted on 2583 eldercare workers in Nordic countries. The care workers experienced their work as physically and mentally arduous, and felt that their opportunities to provide good quality care were weakening (ibid.). The majority felt that they did not receive support from their managers, and the workers lacking managerial support were twice as likely to want to quit their job (Trydegård, 2012; also Hansen, 2008). Thus, the development of competences in terms of professionalisation has stagnated in a few traditionally female occupations, surprisingly without much resistance on the part of the employees (e.g. Andrews & Waerness, 2011).

What if the majority of care workers really turned their thoughts into actions and quit when affected by the multiple changes that deteriorate their wellbeing and their ability to provide good quality care? Trydegård (2012: 125) proposes that thoughts of quitting may serve as a safety valve, and anticipates that most workers would end up staying in their jobs eventually. However, it is alarming if thoughts of quitting are the only way of coping – or practicing resistance - in care work (e.g. also Clegg & Courpasson, 2004). On the other hand, resistance may be useful for grassroots innovations and it doesn't signify intention to quit. Employee resistance may be mismanagement and misunderstanding (Waddell & Sohal, 1998). Employee resistance toward changes should be utilizing rather than overcoming (ibid).

In our view, it is ever more important to ask: *how* care workers question and criticize their situation at work, and what consequences does it have in the organization? In particular, what do the workers and their managers *do* when questioning and criticism arises? However, the dynamics of transformative, employee-initiated actions related to employee criticism at work are not systematically addressed in public administration research. Service innovation research and service design-oriented research especially in Nordic countries have advanced knowledge on grassroots employees' agency - in terms of everyday creativity and innovativeness - in solving organizational problems and developing new services (e.g. Fuglsang & Sørensen, 2011; Mattelmäki & Lehtonen 2006). Despite these advancements in service innovation research, there is a need for studies which could further inform critically reflexive, practice-based and employee-driven managerial interventions in services.

This paper analyzes critique expressed by front-line care workers on their work conditions as a potential impulse for change and innovation-oriented agency. By analyzing interview accounts and interactions of elderly care employees in municipal nursing homes it is possible to achieve new understanding of how employee critique can potentially advance employee-driven innovation. In the paper we analyze connections between employee critique and expressions of daily routines of employees in the context of elderly care services. We see employee critique as a neglected topic of service research as well as an opportunity to develop elderly care services and care work.

2. Employee critique – from resistance to agentive critique as a trigger for change and innovation in manual services Formalities

Why employee criticism sometimes seems to manifest itself as unconstructive resistance, whining or slander, even mudslinging particularly from managers' point of view? Especially in many manual service occupations, people have not been educated interactively perform skills such as judging, building an argument and advocating for it. Continuous changes and declining resources i.e. shortage of staff in many elderly care organizations may cause serious constraints which may signal itself as problems in personal relations between employees.

A line manager in our case study also reported that employees tended to come to her one by one to present concerns, complaints or ideas for improvements. She interpreted that employees were very precautious to present their matters, even new ideas, in team meetings because they were suffering from bad relations between team members and thought that presenting ideas would mean criticizing openly work-mates' current ways of doing things. Presenting ideas openly may also be interpreted as deliberately seeking manager's favor, and a reputation of a 'smoothie' is something that many employees in manual service occupations try to avoid. Criticism and questioning among grassroots employees may be fragile and delicate question. Therefore, it is even more important to address employee critique as a manifestation of and an opportunity for agency that is able to cause positive change and innovation in service work.

2.1. Employee critique as agency for change and innovation?

Criticism expressed directly to managers or work community by a service worker may be powerful – but perhaps neglected - vehicle for change and innovation in manual services. Also worker's self-criticism or self-critical assessment of the team's work patterns involves potential impulse for change and innovation. In addition, receiving criticism from customers and colleagues matters. But how "simple criticizing" or "receiving criticism" turns into agentive and constructive – or reflexive - action in the workplace?

Agency refers both to the motivation and the creativity that drive actors to break away from scripted patterns of behaviour. Agency is a temporally embedded process of social engagement and suggest that it reproduces and transforms the world through the interplay of the habits, imagination, and judgements of actors (Emirbauer & Mische 1998). Notion of breaking away from scripted patterns refer to prevailing practices, and term breaking away inherently involves some kind of critical assessment of behaviours/practices, i.e. questioning, criticizing, or judging. Agency is creative, temporal, it varies situationally, and it is individual and relational, simultaneously. Additional notions of agency address its action-relatedness and creative, transformational quality. Individual agency can be understood as the breaking away from a given frame of action and the taking of initiatives to transform it (Engeström & Virkkunen

2007). Notion of transformational agency captures the context-related, practice-based and experiential character of problem solving in agency. Conflicts, constraints and disturbances – typically causing a lot of criticism - in everyday service situations may simultaneously hinder and boost agency for change and innovation. Practitioners solve conflicts and disturbances during the development of their local activity and work practices (Haapasaari & Kerosuo 2014).

2.2. Employee critique as a springboard to bricolage?

The concept of bricolage gives us a view of agentive *grassroots problem-solving practices of participants*. It suggests that when faced with resource constraints, employees may find innovative solutions in a situation based on ‘whatever is at hand’ (Baker and Nelson 2005, cf. Lévi-Strauss 1967). The participants create and combine their scarce resources and ideas in a novel way in order to develop some useful and novel outcomes (Baker and Nelson 2005, Fuglsang and Sørensen 2011, Salunke et al. 2012). Bricolage is a process of co-shaping an emerging path: participants offer inputs to generate a virtuous learning circle without much delay. The boundaries blur between design and implementation, and between rulemaking and rule following (Garud and Karnøe 2003).

Bricolage is not typically planned beforehand, but it requires situational individual agency. It emphasizes the significance of individuals’ actions and control over resources (Fisher 2012). In order to explore how ‘ordinary’ interaction between employees can lead to changes i.e. service improvements and innovations, we chose to use the concept of bricolage in the empirical analysis. Bricolage serves here as a practice-based, contextual and situational embodiment of agentive action. It may follow or be associated with employee critique and questioning, and it is targeted to solve the constraint with the use of resource integration, “what is at hand”. While being a theoretical concept, it is also a mode of individual or group practice which can be observed empirically. Bricolage incorporates contributions and resources of all participants in a given situation.

Drawing from the concepts discussed above, we explore the origin and nuances of employee critique and its potential connections to bricolage in a context of service work in elderly care. We tentatively suggest and aim to develop the concept of *agentive employee critique* in order to address the significance of agency inherent in mundane criticism that often lay unnoticed or even unvoiced especially among grassroots personnel. “Criticism hidden from managers” –phenomenon is well known in many work settings. Theoretical framework of the paper is depicted in Figure 1.

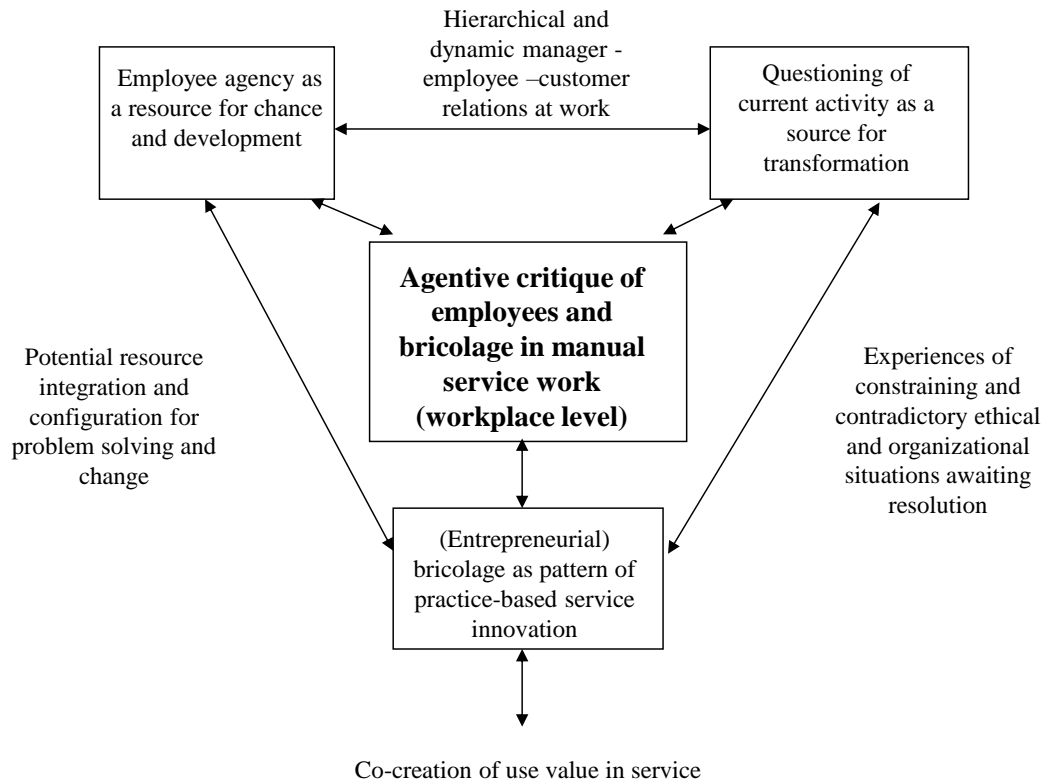


Figure 1. Theoretical framework of the paper

3. Case context with “low threshold” experiment, data and methods

The case context is publicly funded elderly housing facility in a Finnish city. The work in this context is relatively low-wage, physically strenuous, manual elderly care work in assisted living homes which include meals, laundry, cleaning, safety services, recreational activities and health care.

The elderly housing centre was founded in 1970 and it consist of four teams. We focused on one team in this empirical study. Elderly housing centre employs 92 registered and practical nurse and provides 83 house to customers in single and double rooms. The analysis is based on data from a team which consist of 26 employee vacancy and 42 house for the customers.

There is a high turnover of workers, which is typical in this field. Elderly housing centre has left customer apartments unoccupied because of shortage of staff. An increasing number of customers are weak with incurable illness. Residents’ poor condition is a load factor on care work. Personal care for the elderly takes more time from the nurses.

In this setting, each worker performs tasks in single-handed or autonomous pairs. The work is divided into three shifts. Few practical nurses takes care of the elderly in night shifts. Confidentiality matters and ethical issues are also part of the work. Employees deal with elderly peoples’ relatives and doctors daily.

The case data, gathered in 2014, included interview data and ethnographic observation in a team meeting. The data used in the paper are part of a larger data set which includes 110 interviews and 14 ethnographic observation situations in four elderly service organizations. The research design is depicted in Figure 2.

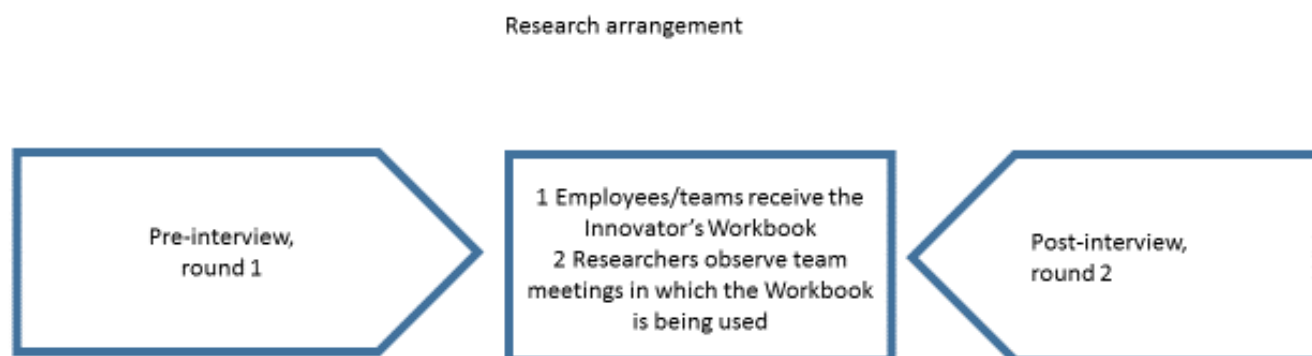


Figure 2. Research design. The research was based on interviews and observation

The thematic interviews lasted from 1.5 hours to 2 hours and included two rounds. Pre-interviews were carried out in April to May 2014 and second round lasted from November 2014 to January 2015. All the interviews were recorded and transcribed with the interviewees' written consent. Interviews traced the interviewees' perceptions of their previous, current and future experiences/expectations, roles, practical tasks/duties, benefits and ideas related to the development of their work. Pre-interviews themes covered the work tasks and role of the interviewee, service context and development, changes in work and management, patterns of team and client interaction and the interviewee's participation in various organizational or service development activities. Interviews also included narratives about problems in daily work and everyday life with the elderly. We tried to find out employees' agency related to development and innovating of work practices by way of pre- and post-interviews. We have picked up data from three employee cases for this paper, these employee's participated also in observation. Innovator's workbook was used in team meetings for eight months. We observed team meetings three time in June, September and November. The middle observation in the last day of September has been analysed precisely for this paper. Detailed field notes were written during the observation, and some meetings were audio- or videorecorded. At the end of each field situation, a detailed field report was written. General description of the data types and employee cases used in this paper is presented in Table 1.

Researchers observed the experiment in which a grassroots innovation-enhancing method, a printed book entitled as "Innovator's Workbook, was given to each em-

employee individually. We characterized the experiment as a “low threshold” and “grass-roots” innovation-enhancing experiment among care workers. The experiment was carried out as part of an ongoing research project TOIMI (Experimenting and evaluating the methods for promoting employee’s transformative agency).¹ In the case described in this paper, employees used the Innovator’s Workbook mainly in team meetings, but their supervisors also encouraged them to learn it and use it individually, since each team member had received their own piece of the book. Innovator’s Workbook included 19 different themes and assignments associated with development and employee innovating at work. It helps for instance employees look at the work from a different perspective, question their current work practices and to find a new enthusiasm for work. One theme (number 10) which is related to this paper deal with critique and innovation. The idea of that theme is to encourage employees to provide feedback and express constructive criticism to others. The aim is to increase employee’s initiatives and proposals. In the related assignment employees were able to practice the giving and receiving of criticism. We have brought this theme in a review because of illuminating and vivid research data.

Data type	Number of data	Date	Case characteristics	Code in the text
Thematic interview , altogether 6 interviews	2 interviews with Employee A; pre-interview (1) and post-interview (2)		Age 50 female elderly care worker in practical nurse position. She has worked 4,5 years in current elderly home, and lived in Finland around ten years. She has worked before as an artist and entrepreneur.	Emp. A Maria
	2 interviews with Employee B; pre-interview (1) and post-interview (2)		Age 60 female elderly care worker in practical nurse position, over 10-year experience in elderly care, also previous occupation for which she has acquired higher education in humanities, and worked previously abroad many years in that other occupation.	Emp. B Anne
	2 interviews with Employee C; pre-interview (1) and post-interview (2)		Age 40 female elderly care worker currently in nurse position (trained nurse), previously worked as practical nurse, and before that she has worked also in other practical occupation.	Emp. C Silja
			All employees work in the same workplace and premises	

¹ The research project examines implications and effects of two different intervention methods on employees’ developmental agency and improving their daily work. This paper focuses on one intervention method, the Innovator’s Workbook.

Observation	1 team meeting; between the two interview rounds		These 3 employees participated in the team meeting, altogether 9 employees participated in the meeting led by line- manager (head nurse).	
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Table 1. Summary of data analyzed in-depth in the paper

4. Case description

The work community is dominated by women employees. Practical nurses make a large proportion of daily work. There was two nurses in team at the beginning of the research project, but one of them left her vacancy. The remaining employee had the workload of two and she was responsible over twenty customers care daily.

The care work involves emotional work and the ability to adapt changing client situations. Care workers are co-operating with relatives daily. Some clients doesn't have relatives or they are disinterest in elderly person's condition, therefore nurses makes all decisions concerning clients' life. Nurses may be the only responsible social contact to elderly person what makes their work emotionally heavy.

There has been big challenges in the case organization. The workers were forced to work in a hurry. In addition, the use of substitutes has strained employee's and increased their work pressure. There has been a lot of reorganization and change in this setting. Workers interpersonal relations has been occasionally tense and these experiences the team members described in the interviews. These organizational and relational factors may have affected employee's willingness to make grassroots innovations.

The elderly house facility in question is originally an apartment building, which severely limit practical care work and the implementation of new practices. Dining and injection are constantly chafing specific matters in this case. Lack of space is workers continuous concern, although client rooms and dining rooms have been reorganized during last years.

5. Results

We first present an overview and summary of the interview accounts of employees' critique, and of agency on development and bricolage, before and after the experimentation with the Innovator's Workbook (5.1). Second, we provide an overview and summary of discussion on a critique-related assignment among service workers during one team meetings (5.2).

5.1. Employee critique in interview accounts

We selected three interviewees for in-depth analysis. Two of them are practical nurses and one of them is nurse. They are different-aged and different stages of their careers. Firstly we looked at how they expressed their transformative agency and secondly how they self-evaluated their own, their work community's and their line manager's agency on a scale of one to ten. Thirdly we sought illuminating quote of agency expressed by employees themselves and finally we formulated researcher's interpretation on each employee case (see Table 2-3). Analyzes have been made from two rounds of interviews.

Employees regarded organizational changes with suspicion in the first round of interviews (see Table 2). The workers expressed different degrees of resistance and strong critique against organizational changes. The biggest target of resistance was a new team division. It seemed that developing new working pattern as one team turned out to be very slow process, possibly because of team member's unwillingness to break the boundaries. Resistance against workplace settings represented in employee's action. The workers solved the problem pragmatically in their own way. For instance, one of the practical nurses insisted not to follow general rules and retained her own way of caring related to nutrition. This action could be interpreted as a clear protest and it highlights very active individual agency.

The workers expressed individual agency, as they often reported how they tried to individually influence work conditions related to caring practices by making initiatives to line manager only. On the other hand employees' agency was relational, as they expressed criticism directly in team meetings (for instance as depicted in Table 4).

Interestingly enough, the workers were more satisfied with their work and working conditions in the second round of interviews (see Table 3). Criticism toward working conditions decreased. Interesting observation was that the employees expressed more social support to each other as well as courage to voice their ideas and initiatives aloud in team meetings. Employees also gave better grades of their own agency on development. In addition, they referred work atmosphere improved during the year 2014.

Employee	Characteristics and objective of agentic critique	Self-grading of agency on development of (1) one's own (2) work community (3) line manager (scale 1-10) and (4) number of bricolage accounts	Summary of agency expressed by (1) employee and (2) researchers' interpretation
Emp A 'Maria' practical nurse	<p>Partially negative expressions towards ongoing changes, no clear expressions of self-critique or self-reflection</p> <p>Critique on structural and organizational issues in care work, and on lack of resources and high turnover of staff (large amount of deputy personnel)</p> <p>Also adaptive and agentic views: <i>"however I feel that I can influence the team and activities"</i></p>	<p>(1) Oneself: 7</p> <p>(2) Work community: 8</p> <p>(3) Line manager: 9</p> <p>(4) No substantial descriptions of bricolage (Finnish not her mother language)</p>	<p>(1) <i>"I have a few ideas. I take responsibility and try out new ideas. I'm not shy or quiet person"</i></p> <p>(2) Socially active caregiver, positive attitude on work development, she does not make many initiatives individually, but likes to be part of putting new ideas into practice</p>
Emp B 'Anne' practical nurse	<p>Expresses strong resistance and critique towards organizational and work-related changes (i.e. particular manager), reports even her individual action of protest towards manager's orders</p> <p>Also lot of reflexive self-critique and questioning of one's own orientation to customers and time allocation between customer care and other duties</p> <p>Partially also optimistic future orientation on personal learning and adaptation</p>	<p>(1) Oneself: 7</p> <p>(2) Work community: 7</p> <p>(3) Line manager: 7</p> <p>(4) 5-6 relatively detailed and rich descriptions of bricolage, mostly employee-initiated examples of using one's personal resources, also one customer-initiated case</p>	<p>(1) <i>"I admit that I do have strong resistance to change, and actually I'm surprised about that... I do express my points of view, and I take positions... I have a lot to learn, though, especially on how to take account of the residents' views more and more"</i></p> <p>(2) Ethically reflexive caregiver, a lonely rider, who applies individually-oriented thinking and actions towards changes and new ideas, she is also capable of expressing self-critique</p>
Emp C 'Silja' nurse	<p>Reports previous critical attitudes towards changes, now expresses mainly positive attitudes: <i>"I feel serene about ongoing changes"</i>, no clear expressions of self-critique or self-reflection</p> <p>Critique on amount of work and task distribution, and on leaders failing to put organizational change (teams integration) into practice in a right way</p>	<p>(1) Oneself: 7</p> <p>(2) Work community: 9</p> <p>(3) Line manager: 8-9, Upper manager: 6</p> <p>(4) 2-3 descriptions of bricolage</p>	<p>(1) <i>"I have never been much an idea-generator. Therefore I would not be able to be in a supervisor position or alike. But I do achieve a lot in my work, I really can achieve."</i></p> <p>(2) Quiet achiever and bearer of responsibility, strong tendency to under-value or underestimate her own innovativeness, since she also do make initiatives and gives support to others' ideas</p>

Table 2. Pre-interview (1. round): agentic critique, agency on development and bricolage, based on interviews of three employees (preliminary analysis)

Employee	Characteristics and objective of agentive critique	Self-grading of agency on development of (1) one's own (2) work community (3) line manager (scale 1-10) and (4) number of bricolage accounts (5) mention of Innovator's Workbook	Summary of agency expressed by (1) employee and (2) researchers' interpretation
Emp A 'Maria' practical nurse	<u>Changes:</u> Less amount of criticism, many positive expressions of work situation, employee is quite satisfied with her work	<u>Grading improved</u> (1) Oneself: 8 (2) Work community: 8 (3) Line manager: 9 (4) No change: no substantial descriptions (5) Mentions several positive evaluations on the Innovator's Workbook	(1) <i>"I'm always interested in the development side. Especially if methods are right and normal. I try to be flexible and listen to others' opinions."</i> (2) <u>No clear change</u> compared to 1. interview round
Emp B 'Anne' practical nurse	<u>Changes:</u> Less amount of strong criticism, mention of adaptation and reflection, expresses some satisfaction with her current work situation Clearly less amount of direct self-critique, instead humorous self-reflection towards her previous individual protest	<u>Grading improved</u> (1) Oneself: 8 (2) Work community: 8 (3) Line manager: 8 (4) 4-5 descriptions of bricolage, mostly employee-initiated, among them one customer-driven case (5) Mention of having used the Innovator's Workbook individually, written in her own remarks, positive comments on the booklet	(1) <i>"I'd like to develop things in a way that there would be two or three of us nurses who would come up with a really good joint idea, and that we were given full freedom to experiment with the idea... especially ideas that involve customers and their views are my kind of thing"</i> (2) <u>No lonely rider anymore:</u> Less individually oriented view on her developer role. Work-pair –driven and customer-oriented developer of care. Relational and co-creative view towards changes and innovation
Emp C 'Silja' nurse	<u>Changes:</u> A larger number of proposal for resolving daily work problems, mention of the importance of colleagues' support, expresses strong courage on grassroots innovations, 'entrepreneurial' employee More critique against line manager, tired of the work situation.	<u>Grading improved, except of manager's clearly declined</u> (1) Oneself: 8 (2) Work community: 8 (3) Line manager: 6 (4) No particular change: 1-2 descriptions of bricolage (5) Critical comments about the Innovator's Workbook, expression of reservations towards the situation in the organization in which such method was applied	(1) <i>"I develop work with nurse -oriented thinking. I propose a more flexible solutions than others. I'm equitable to everyone and I know the customer's best."</i> (2) <u>Clear change:</u> Employee has taken bigger developer role. She is one of the initiators of the new practices. She underestimates her valuable contribution.

Table 3. Post-interview (2. round), changes in agentic critique, agency on development and bricolage based on interviews of three employees after the experiment, use of the Innovator's Workbook (preliminary analysis)

We interpreted that at least partial explanation for improved satisfaction and decreased criticism was due to the fact that there had been advancements in getting and keeping enough manpower in the organization. There was less experiences of severe hurry at work. It may be also that personnel had finally adapted to new team arrangements.

What we could not quite explain with improved personnel situation and adaptation was the observation that employees expressed more social support to each other as well as courage to voice their ideas and initiatives aloud in team meetings, and that they gave better self-evaluation of their own agency on development.

In order to further explore these changes in interview data, we now turn to look at a piece of analysis based on observation in one team meeting in which the Innovator's Workbook was used to deal with theme that was specifically related to critique and criticism at work.

5.2. Bricolage-related accounts and interactions during a team meeting

The ethnographic observation of the team meeting in which the Innovator's Workbook was used took place in the afternoon, in the meeting room that was used also as a social gathering place for the employees during lunchtime and breaks. The three employees whose interviews were analyzed above participated in the team meeting. Altogether nine employees participated in the meeting led by line-manager (head nurse).

Two researchers also participated in the meeting to observe the situation, discussions and interactions. They were supposed to do as less interruptions as possible, i.e. clarifying questions. The meeting was audio-recorded with participants' written consent, and detailed memo was kept during the meeting. The meeting lasted approximately 1,5 hours. The preliminary analysis in this paper is based on memo.

Theme number 10 in the Innovator's Workbook that deal with critique was discussed in the meeting. A few employees had the book with them when they arrived. The theme was agreed upon and decided among the employees in the previous meeting. The idea of that theme and related assignment was to encourage employees to provide feedback and express constructive criticism to others in matters of work and service development. The aim was to help understand questioning and criticism not as something to be avoided but as potential source for development, and help increase employee's initiatives and proposals. In the related assignment employees were able to practice the giving and receiving of criticism.

Six turning points were found in the discussion on critique-theme (Table 4). We call these turning points as 'bids', kind of invitations to some other person or persons to join in, i.e., add something, comment on, or answer to a question. Especially at the start the line manager put forward 'bids', but as the meeting proceed, also team members such as practical nurses became active. The most significant turning point,

number 2 (see Table 4), was made by one employee, as she reacted relatively strongly to researcher's question and corrected researcher's wrong information.

The workers' discussions and interactions during the team meeting supplements the analysis based on the interview data. Table 4 presents an overview of the preliminary analysis. Critique as potential impulse for new ideas and initiatives was demonstrated in an interesting way in the meeting. Criticizing was intentionally addressed as term in speech for instance by one employee in her voicing that "I am criticizing... [the matter debated on]. Expressions of criticism was linked with new ideas and quick experimentation, bricolage, on work practices. In a way, participants rehearsed expressing their criticism and ideas openly and publicly.

Line manager praised the discussions and ideas several times during the meeting. As reported by the line manager immediately after the meeting, she was surprised by the active participation and rich ideation of the employees. Almost all participants took part in the discussion. Several new ideas and initiatives were dealt with in the meeting. It was also revealed that quick change and experimentation on dining arrangements, as bricolage, (i.e. with resources at hand), had already taken place by the employees' own decision, and in the meeting they informed the line manager about the results and debated on them together (see Figure 3). In addition, later on the line manager reported that the team has continued to speak openly in team meetings.

In a way, criticism-theme turned into powerful agentive critique in the meeting, as it was constructively shared and developed into new solution-ideas by the work community in a form of bricolage. Collective agency on development seemed to strengthen during the meeting between team members and between line-manager and the team.

We interpret that the use of Innovator's Workbook method have had an effect on the employees' transformative, developmental agency, as observed in the changes of the interview accounts after the intervention. The employees expressed more social support to each other as well as courage to voice their ideas and initiatives aloud in team meetings, and they gave better self-evaluation of their own and their work community's agency on development.

Key phases of the meeting	Introduction of new topic and its initiator	Subject matter of 'bricolage'	Action points, participants
0 Private insights of the line manager shortly before the meeting	Negative: almost the whole staff changed within short period of time Positive: staff shortage has been almost resolved	-	-
1 Preparing team discussion	LM informing, reminding the staff about their duties during her leave of absence (forthcoming)	-	LM's managerial speech associated with deadlines
2 Discussing on the topic	<p>1st "bid" LM's direct question as opening of the group discussion [referring to topic in the booklet]: <i>How do you feel about criticism, how does it feel to receive critique?</i></p> <p>2nd "bid" a turning point revoked by R's question leading to E's interruption: <i>But it is not dropped to taking off!</i> [E using powerful expression, followed by several small questions, and a few expressions of praise by LM]</p> <p>3rd "bid" LM's suggestion and praise: <i>It is good that you</i> [referring to individual employee] <i>despite the criticism drove this matter forward</i></p> <p>4th "bid" LM's new question to all: <i>What other matter should be changed, any thoughts?</i></p> <p>5th "bid" E: <i>I am criticizing how this is now arranged ...</i></p> <p>6th "bid" E introducing of new subject matter that needs development</p>	<p>Referring to Innovator's workbook, assignment no 10 (receiving and expressing critique)</p> <p>Customer dining arrangements in the facility, mainly from employee point of view, but also customer point of view</p> <p>LM dominating, 2-3 employee participants in the discussion, one E initiating a turning point</p> <p>New question, looking for new topic/ideas to discuss</p> <p>E's initiative: customer hygiene matter, new showering practices, mainly customer point of view</p> <p>E's initiative: new ordering practice of customer's personal care equipment, mainly employee point of view</p>	<p>-</p> <p>Dining arrangements experimented and in a process to be sustained, new practice under discussion (employees' informing LM)</p> <p>LM's suggestion to expand experimentation</p> <p>LM connecting topic of the workbook to new daily practices</p> <p>No clear decision</p> <p>Several employees participating</p> <p>Several employees participating</p> <p>Decision by LM, marked in the memo</p>
3 Closing team discussion (scheduled time running out)	LM's question to all: <i>What subject in the booklet shall we work with in our next meeting?</i> E's initiative: <i>We should take seven (no 7),</i> LM's comment: <i>Yes that is a good subject.</i>	-	Decisions: next subject from the booklet, setting the date for next meeting
4 Private insights of the line manager shortly after the meeting	LM being surprised by the active discussion and employees' direct initiatives, also reporting an employee previously saying to her that "we shall take this seriously" which LM had interpreted to mean serious use of the book in development of work practices, 'innovations'	-	-

Table 4. Preliminary analysis of team meeting in which the Innovator's Workbook was used as a resource. One topic and related assignment (expressing and receiving critique in ones work) had been picked up from the book in the previous team meeting and decided to be discussed in this meeting (30.9.2014). Participants: line manager and 9 elderly care employees (one male), two researchers observing. Duration approx. 1,5 hours. E=employee, LM=line manager, R=researcher

Employee-driven innovation in customers' dining arrangements

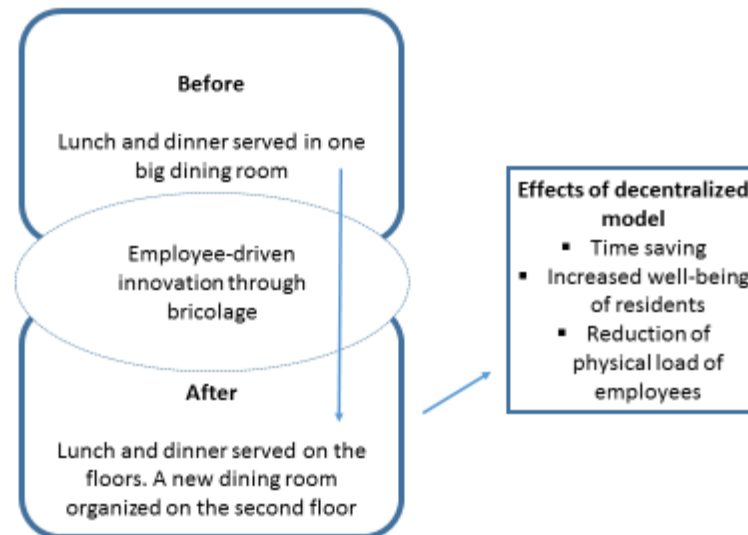


Figure 3. Employee-driven innovation in customer's dining arrangements.

6. Discussion

The interest of the paper was on *how* elderly care workers question and criticize their situation at work, and what consequences does it have in the organization? In addition, we aim to investigate what do the workers and their managers *do* when criticism arises? We suggested an integrative framework for exploring the nuances of employee critique and its potential connections to bricolage in a context of manual service work in elderly care. We tentatively suggested the concept of *agentive employee critique* in order to address the significance of agency inherent in mundane criticism that often lay unnoticed or even unvoiced especially among grassroots personnel in manual service work.

In the introduction we referred to negative research results on experienced wellbeing of elderly care workers. Low resistance against the poor working conditions and shortage of resources was being observed as well. On the other hand, it has been suggested that resistance may be useful for grassroots innovations and it doesn't signify intention to quit. Our explorative study supports observations made by Waddel and Sohal (1998) that employee resistance toward changes should be utilized rather than trying to overcome it (ibid). We observed that despite arduous working conditions, care workers expressed active agentive critique, and they were able to turn it into constructive and innovative solutions in order to improve their working conditions

and customers quality of life. The employees' actions and interactions represented transformative agency discussed in the beginning of this paper. This is positive and important research results although it was shown in small data set. Evidence included data from interviews and ethnographic observation that supported each other.

Managers of manual work may need to consider employee critique as an important and potentially innovative resource in the workplace and in customer relations. As public organizations tend to lower hierarchies and integrate services, employees acquire new responsibilities, and co-creating of services becomes more usual. In addition to managers' roles, there also existed other responsible roles in our study significant for bricolage. Our findings support observations of Fuglsang and Sørensen (2011) who pointed out that many potential innovations in the form of bricolage occur without the perception of managers. The combination of frame, freedom, control of resources and responsibility for implementation supports the employees to utilize opportunities and perceived competences. These observations have implications for practical applications of service-dominant thinking, as most earlier research addressing co-creation of value have either focused on planned activities or practices at the upper organizational level.

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B: Servitization

B1: Servitization

Chair: Thomas Meiren

Development of Smart Services in Manufacturing Companies

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The digitisation of products and processes is an important trend in manufacturing companies. This also changes business models and influences the offering of product-related services. In particular, a new type of highly IT-based services, the so-called “smart services”, will provide various new possibilities for companies. A reference framework consisting of a process-activity model, methods and tools as well as organisational arrangements shows, how such complex services can be developed in a structured way.

1. The rise of smart services

Information and communication technology has become an integral part of manufacturing industries. In particular, the increasing digitisation of products and processes is triggering new business models and the associated organisational systems, networks and consumption patterns. This paves the way for a new type of highly IT-based services, the so-called “smart services” (Kagermann et al., 2015) like advanced status and diagnostics applications, new control and automation solutions as well as profiling and behaviour tracking. They are making use of the growing volume of data that is being captured every day and are combined in innovative ways in order to create on-demand, personalized solutions for customers. Moreover, product performance and customer behaviours will get visible as they have never been before. Due to the high complexity of smart services, systematic approaches for their development are required, and first promising research can be found in the area of New Service Development, Service Engineering and Service Design (Papastathopoulou; Hultink, 2012, Fähnrich; Meiren, 2007).

Based on two empirical studies – one within the European Project “T-REX” (Saccani; Adrodegari; Alghisi, 2014) and another within a joint initiative of European service researchers (Edvardsson et al., 2015) – the current business models and service offerings of manufacturing companies have been analysed. It has become obvious that their service business has undergone extensive structural changes within the last decade and, also today, they are still facing many challenges, in particular, when it comes to the use of information and communication technologies. Many manufacturing companies are, however, hindered by the fact that their present corporate structures and processes are not designed to enable complex IT-based services to be efficiently developed and launched on the market. Difficulties are frequently encountered because appropriate business models are missing, requirements of customers are not clear, new services are not accurately defined and tested, IT integration is challenging, and the service staff is not sufficiently trained.

2. Framework for the development of smart services

Taking into account existing knowledge in the area of New Service Development, Service Engineering and Service Design, a reference framework for the development of smart services has been elaborated. In particular, it explains the creation of a new service from its first idea at the beginning to the market launch at the end by reflecting an external perspective (e.g. customers, competitors), an internal perspective (e.g. management, service staff), and an economic perspective.

The aim of the framework is to provide companies with extensive support in developing new smart services or redesigning existing smart services. It puts a particular focus on the economic perspective, i.e. the systematic approach is intended to lower both the costs of the smart services and the total cost of ownership for the products to which they relate.

In addition to a (level 1) typology to distinguish between basic scenarios for the development and refinement of smart services, the framework consists of a (level 2) process-activity model, (level 3) methods and tools, and (level 4) organisational arrangements (see Figure 1).

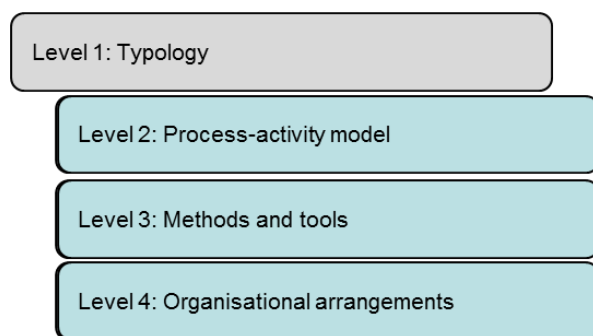


Fig. 1: Structure of the reference framework

The individual levels of the reference framework are explained in detail in the following chapters.

2.1. Level 1: Typology

The reference framework aims to help companies develop more professional smart services. This may include the improvement or redesign of existing services, or the development of completely new services. Moreover, it is crucial regarding the choice of process and methods whether the revised or new services are being offered to existing markets or customers, or whether they are to address new target groups. These considerations then provide, on the one hand, the dimension of smart services (existing vs new) and, on the other hand, the dimension of the target market (existing vs new). The resulting typology is depicted in Figure 2.

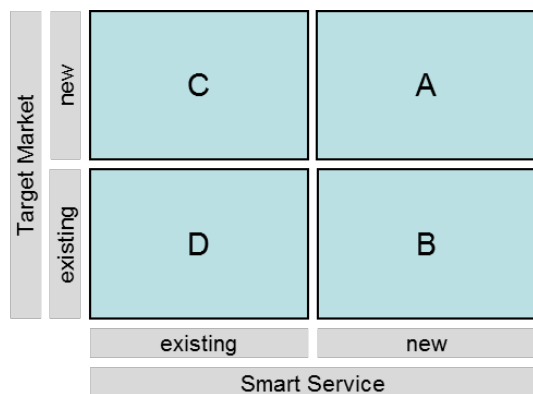


Fig. 2: Typology for development activities

The typology is based on the well-known Ansoff Matrix (e.g. Kotler; Keller, 2012). While this nevertheless serves as a tool for strategic management and is primarily used as an aid for planning corporate growth, the modified typology in the reference framework should pursue operative aims. In particular, the typology is intended to provide support in making key decisions on defining areas of focus and selecting necessary activities right at the start of the development process.

The four basic categories of typology and the ensuing consequences for the development process are explained below.

Type A

What is undoubtedly the most demanding category is the development of new smart services for new markets, where a new range of services is developed for clients with whom the company has not previously worked. In order to ensure success in the development process and to mitigate risk, conducting a run-through of the complete development process is recommended. In particular, the information collated in the development of the initial business model should be supplemented by an extensive market analysis. It is also advisable to adopt a strongly external perspective in the course of the development process and to integrate potential customers on an ongoing basis where possible (e.g. through interviews and workshops).

Type B

Like Type A, the second category is concerned with the development of new smart services, but for existing markets rather than new ones. This has the advantage that market structures (customers, competitors, multipliers, etc.) are generally already familiar, making the communication of the relevant information much less complex. Similar to Type A, conducting a complete run-through of the development process is also recommended, although individual methods that adopt the external perspective may be conducted in a simplified way or even skipped completely. However, they should only be skipped completely if the markets and customers are already very familiar (as is the case, for example, if a new smart service is only to be developed for one lead customer).

Type C

The third category is based on existing smart services that need to be adapted to new target groups. This is a very typical case that often gains importance with the increasing internationalisation of many companies, i.e. existing services need to be adapted to local conditions (e.g. language, cultural requirements, different logistics and new partners). As for Type A, the external perspective is also very important for Type C, and conducting the associated activities consistently is recommended. By contrast, tasks described in the development process that affect the internal, operative design of the service can be skipped – as long as this does not result in any change requests.

Type D

The supposedly simplest category is the redesign of existing smart services for existing target groups. This generally concerns selective adaptations to the range of services (e.g. adapting the delivery process, cooperation with new partners, use of new IT or communications technology). For Type D, a comprehensive requirements analysis should be conducted first and then only those activities from the development process that actually affect the improvements to or the redesign of the smart service should be selected.

The aforementioned typology provides an initial tool for the classification of the development task and for making the first selection decisions with regard to the process and methods to be used in the development.

2.2. Level 2: Process-activity model

The core element of the reference framework is what is known as the process-activity model. This takes the form of a detailed description of the entire development process for smart services and the tasks to be conducted.

As a result of a literature analysis and requirements derived from practice (i.e. from a study conducted of 95 companies and a workshop with 12 practitioners), the basic type selected is known as a stage-gate model, which describes the development of the service from the requirements analysis to market launch. Stage-gate models are characterised by the linear sequence of the individual, consecutive stages in the process (Cooper, 2008). By doing this, there are clearly defined results after each stage, which can then be used in subsequent stages. For companies, particularly SMEs, stage-gate models are advantageous because they are clearly structured and easy to understand, and the pending development activities are ordered in a clear and logical way.

The process-activity model for the development of smart services is summarised in Figure 3.

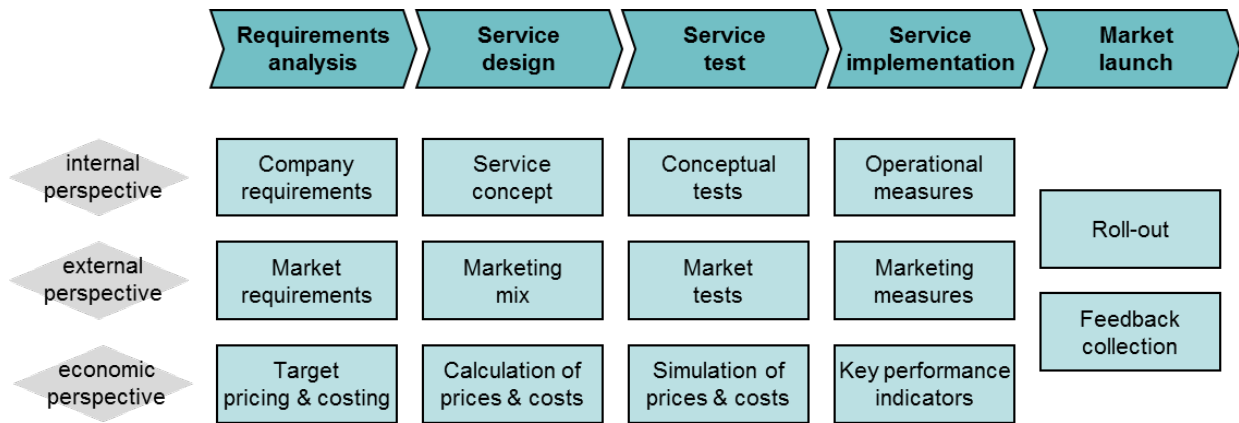


Fig. 3: Process-activity model

This model follows the important development stages of requirements analysis, service design, service test, service implementation and market launch. It has also been supplemented by three perspectives (internal, external and economic), which must be taken into account in each phase.

Development phases

As discussed at the start of the chapter, the model is based on a clearly described service concept, including the relevant business model. Generally, the information collated here tends to be of a strategic nature, however (e.g. to which markets and which customers will the smart service be offered? Which are the most important value propositions of the service?) It is also necessary to collect information about the operational design of the service.

The actual development work begins with the *requirements analysis*. Requirements are collated and assessed from a company perspective (“What form should the smart service take for the management and staff?”) and from a customer point of view (“What form should the smart service take for the customer?”). The aim is to obtain a clear picture of the details of what the smart service needs to be able to do in order to be successful. It is also important to identify critical factors that must be avoided in order to prevent the failure of the service. Fulfilment of those requirements evaluated as the most important provides a clear guideline for the subsequent stages in development.

The next stage is *service design*. Here, the service features to be developed are described, the processes for the later provision of the service are defined and the use of resources planned. In addition, a marketing concept should be developed at this stage in order to integrate market and customer aspects for the subsequent market launch of the new service from an early stage of the development process, as well as carrying out a detailed price and cost calculation of the service.

The *service test* is then the next step. As the previous results are of an overwhelmingly conceptual nature, this stage focuses on carrying out a practical test of the smart service. Even if services seem to be predominantly intangible by nature, a range of approaches are available. They include everything from acceptance tests among staff and customers, partial implementation of the concepts (e.g. IT demonstrators, user interfaces) to initial tests with the actual customer.

Service implementation follows the test phase, and this is where the previous tasks are now implemented within the company. This primarily affects technology/IT tasks (e.g. hardware/software), implementation of organisational measures (e.g. assigning responsibilities, preparing operational instructions and procedural guidelines) and the implementation of HR measures (e.g. filling newly created vacancies, training staff). This stage also includes implementing the previously developed marketing concept and establishing essential KPIs for monitoring and managing the subsequent fulfilment of the service.

After a successful internal implementation of the new service, it is now ready for *market launch*. This predominantly concerns the roll-out of the service, i.e. providing the necessary resources and the approval of the service for the customer. Internal and external information and communication measures should also be conducted in parallel. This stage requires start-up monitoring and checking the success of the service. Final adjustments may have to be made on the basis of customer or staff feedback (e.g. through surveys and the evaluation of complaints).

Once the market launch is complete, the development process has come to an end and the new smart service may be handed over to the relevant department.

Internal, external and economic perspectives

In addition to the chronological sequence of the development stages, the process-activity model also integrated a second structuring level. This involved three different perspectives that have to be taken into account at each stage in order to ensure the most comprehensive process possible and, ultimately, the success of the service.

The *internal perspective* looks at the company's point of view. This primarily focuses on operational aspects of the smart service. Typical examples include the planning of processes and resources. The work carried out should be compared with the requirements of internal stakeholders (staff, management, etc.) on an ongoing basis.

By contrast, the *external perspective* describes the market or customer's point of view. For services that are characterised by the close integration of the customer by their very definition, it is essential that they are not developed from a purely internal perspective. In the same way as internal stakeholders are included in the development process, external stakeholders – primarily, the customer, but also partners, suppliers, etc. – should also be integrated.

The *economic perspective* is the third and final level. As the cost perspective is important for every company – both for the smart services and for the associated (tangible) products – the economic perspective was also integrated into the model. Even in business practice, it is clear that services are not only seen as a 'necessary evil' in order to maintain product business but increasingly also as an opportunity to boost the company's financial results (Neely, 2009).

2.3. Level 3: Methods and tools

Although the process-activity model forms the 'backbone' of the entire process, it does not describe in detail *how* the tasks described are to be accomplished. Practitioners, in particular, would have difficulty at this point knowing exactly what it is they have to do in order to successfully complete a task. For example, if a task such as

the analysis of market and customer requirements seems obvious, the question still remains as to how exactly it should be carried out and which methods are available.

The third level of the reference framework addresses precisely this challenge and provides a selected set of methods, templates and tools. These are listed according to the specific stages of development in Table 1.

Development phases	Methods
Requirements analysis	Visualisation of service ideas Interviews Workshops Requirements list Target pricing and target costing
Service design	Service description Process steps for smart services Service blueprinting Role concepts for service delivery Interaction design Marketing mix Cost calculation
Service test	Service FMEA Service concept testing Pilot customers and test markets Lab approaches for service testing Simulation of prices and cost
Service implementation	Implementation planning Training Marketing measures Key performance indicators
Market launch	Roll-out planning Customer satisfaction survey

Table 1: Overview of selected methods

The focus is on methods that are specific to services. In addition, methods for project management are also relevant for service development projects, but they can easily be transferred and applied, so that they are not explicitly mentioned in the methods part of the reference framework.

2.4. Level 4: Organisational arrangements

In contrast to product or software development, the systematic development of services remains uncharted territory for most technology-based companies. There are often no specific units within the company to take on this task, or no clearly defined responsibilities as to who is responsible for which individual activity (Schäfer, 2014; Meiren, 2006). For this reason, the reference model was supplemented by a fourth level in terms of organisational arrangements.

Organisational structures

For larger companies that already have organisational structures in place, the question soon arises as to who will be responsible when it comes to new services. This might be the service department, but it could also be marketing, sales or the strategy department or business development if there is one in the company. Or should an internal R&D department be established in order to develop the service, as is the case for product and software development?

If the issue of organisational structure is abstracted, it is possible to determine whether the company should set up an internal unit for the development of the service or not. In addition, a decision must also be made as to whether such a business unit would work on this task continuously, or just periodically. The possible alternatives are illustrated in Figure 4.

Service development as a permanent task	Existing organisational unit to develop services	Special organisational unit to develop services
	External development of services	Service development by cross-functional project teams
Service development as an additional task		Service development as a main task

Fig. 4: Basic organisational alternatives for the development of smart services

Empirical evidence shows that there is no ideal solution here. Rather, it is a business decision that largely depends on the value that is given to new services and the degree to which the company is prepared to invest in them.

Roles and responsibilities

The basic anchoring of service development within organisational structures is a strategic decision for the company. Furthermore, the question also arises from an operational level as to which persons should take care of which tasks and which skills are required for this.

The following comments focus, however, on resource planning for service development projects because in practice it is usually necessary to resort to existing resources, and bottlenecks on the human resource side can often arise very quickly. Furthermore, many service development projects are so complex that they typically involve a large number of employees from different parts of the company. What are frequently referred to as role concepts are explained below as a suitable instrument for assigning personnel to development tasks (Bullinger et al., 2003). Role concepts describe the human resource skills necessary to develop a particular service in the form of roles. These roles are defined on the basis of the experience, expertise and skills required to perform each individual task. They do not, however, make any recom-

mendations as to who will actually fill them. A role is characterised by competencies and responsibilities. It is quite possible for one person to be assigned several roles, or for several persons to be responsible for one and the same role.

The fact that the tasks themselves are considered separately from the persons appointed to perform them, make role concepts an extremely flexible planning instrument. Skills and responsibilities can be specified at an early stage, qualification requirements can be estimated and suitable qualification measures initiated. Capacity bottlenecks can be anticipated sooner and, if necessary, new staff taken on in good time.

Role descriptions form the basis for every role concept. They might be structured as follows:

- *Meaningful name:*
Roles can be given any name depending on the specific requirements of each firm. Possible role names for service development projects could include: project manager, marketing planner, process designer or roll-out manager.
- *Tasks and outcomes:*
Description of the responsibilities assigned to each role or role owner in connection with service development.
- *Skills:*
These can be subdivided into various categories, such as technical skills, methodological skills, social skills and media skills.
- *Relationships with other roles:*
Each role is characterised by relationships with other roles: for example, relationships of a cooperative nature or where one role is considered to be a special variant of another, more general role.

Roles should not be confused with positions. In other words, they are defined solely for the purpose of service development. A 'controller', for instance, does not necessarily have to come from the company's financial controlling department, but simply needs to be someone with the necessary skills in financial controlling to handle the specified project tasks.

The following generic roles (Table 2) could be used for a broad range of service development projects. Nevertheless, it is strongly recommended to adjust the set of roles to the company situation.

Roles	Responsibilities
Project manager	<p>Schedule project (incl. activities, responsibilities, time-table, milestones)</p> <p>Allocate the required resources to each activity (e.g. persons, tools, equipment)</p> <p>Define of all methods and tools to be used in the project</p> <p>Estimate costs on the basis of available key figures</p> <p>Contract external partners</p> <p>Establish basic reporting for the project</p> <p>Coordinate and supervise all project activities, including initialising the process phases and activities as well as decisions about measures to rectify problems</p> <p>Monitor the project (completion dates, effort, costs and activities)</p> <p>Document of projects activities</p>
Marketing manager	<p>Coordinate customer involvement into the project</p> <p>Support the collection of internal and external requirements</p> <p>Support the price and cost calculations</p> <p>Design and implement the marketing mix (brochures, presentations, publications, trade fairs etc.)</p> <p>Support the collection of feedback from customers and employees</p>
Manager prices and costs	<p>Execute the price and cost calculations of the service</p> <p>Execute the lifecycle cost calculation of the related products</p> <p>Prepare and evaluate make-or-buy decisions</p>
Service product manager	<p>Analyse current and future markets trends</p> <p>Collect internal and external requirements</p> <p>Support the price and cost calculations</p> <p>Specify and describe the service</p> <p>Plan and execute service tests</p> <p>Document the service</p> <p>Collect feedback from customers and employees</p>
Operations manager	<p>Plan and implement suitable organisational structures for the service</p> <p>Plan and implement suitable delivery process for the service</p> <p>Determine and provide the operating resources necessary to deliver the service</p> <p>Plan and deliver the required operating resources for the service</p> <p>Define KPI's for the service</p>
HR manager	<p>Coordinate employee involvement into the project</p> <p>Define roles for the delivery process of the service</p> <p>Identify qualification needs</p> <p>Recruit new staff for the service</p> <p>Plan and organise the training of the staff for the service</p>
Systems manager	<p>Plan and coordinate IT-related activities of the service</p> <p>Test IT components of the service</p>

Table 2: Roles for service development

In many cases, it could also make sense to define customers as a role as well, in particular, if they are directly involved in development projects (e.g. as lead users).

A role concept should be clearly linked to the process-activity model as it is shown for the generic role concept and the process-activity model of the reference framework (see Figure 5).

E Execute S Support A Advise	Company requirements	Market requirements	Target pricing & costing	Service concept	Marketing mix	Calculation of prices & costs	Conceptual tests	Market tests	Simulation of prices & costs	Operational measures	Marketing measures	Key performance indicators	Roll-out	Feedback collection
Project manager														
Marketing manager	S	S	S		E	S		S			E	A	S	S
Manager prices and costs			E			E			E			A		
Service product manager	E	E	S	E	S	S	E	E	S	S	S	S	S	E
Operations manager				S			S	S		E		E	E	
HR manager				S			S	S		S		S	S	
Systems manager				S			S	S		S		S	S	

Fig. 5: Role concept and process-activity model

Within a real project the next step would be the definition of the project team, i.e. the assignment of real people to the defined roles. The objective should be that each project member has the skills that are defined in his role descriptions. If not, qualifications measures should be initiated for the project member. Other alternatives could be the outsourcing of project tasks to external partners that have the relevant competencies, or even the recruitment of new staff according to the role profiles.

3. Outlook

Smart services offer companies which produce machines and equipment an interesting possibility to develop their service business. The advantages are being able to connect with almost every point on the earth through the medium of the internet without additional interruptions. Above all, internationally active companies offer additional services to their customers which could not be achieved previously. For example, small and medium sized companies which do not have the resources for a comprehensive world-wide presence can now deliver services to their customers like remote monitoring, online documentation and online training sessions.

The challenges which are to be overcome with the development of smart services may however not be underestimated. A service is then perceived as excellent by the customers if the details add up, and even small irregularities in the service process, in customer communication or in information technology can lead to the displeasure

of the customer. As shown, it is recommended that a structured procedure with the development of services should be established in order to secure an efficient, customer oriented process and to avoid possible weak points.

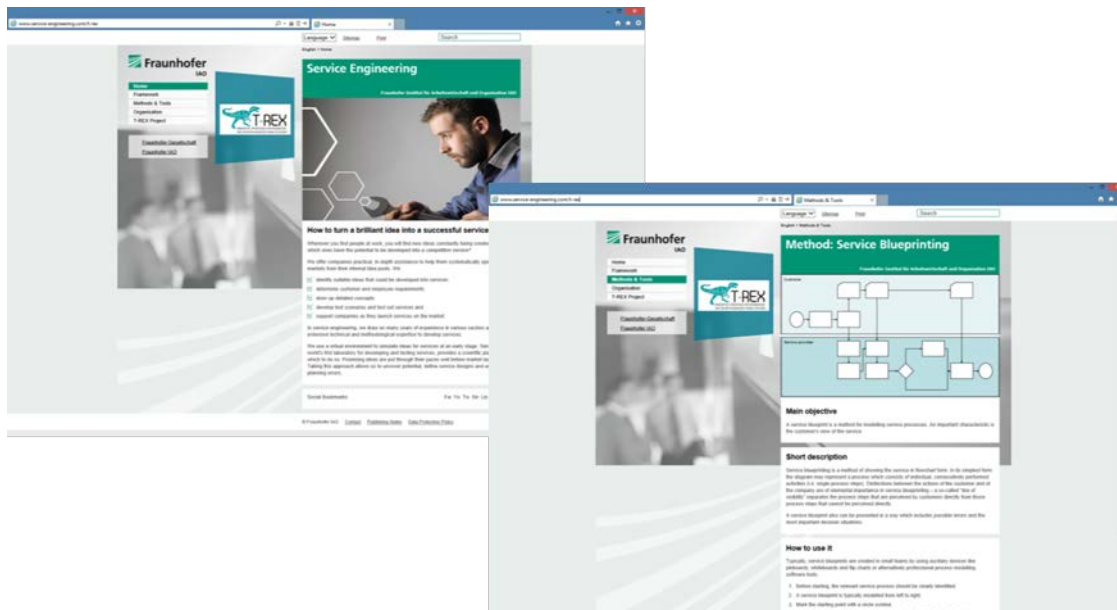


Fig. 6: Internet-based guideline

The reference framework including more detailed descriptions of the single levels will be published on the Internet, so that a broad number of companies could make benefit of it. A first prototype of this online guideline has already been developed (see Figure 6). It will go public at the end of 2015.

Acknowledgements

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Servitization and Productization: two faces of the same coin?

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The ongoing convergence and integration between manufacturing and service sectors involves the firms' adoption of new strategies, namely: servitization and productization. Despite servitization having already been discussed in depth by scholars, little has been said on productization. The thematic analysis of 27 peer-reviewed journal articles lead to define productization as the process of transforming a service company offering by adding tangible products or by decomposing service components into combinable modules. Moreover, productization and servitization need to be considered as “two faces of the same coin”, which acting reversely lead to considering the existence of a new company type: the solution provider.

1. Introduction

The companies of our time compete in what has been defined as a “Customer Economy” (Seybold *et al.*, 2001). This means that society is controlled by customers, who exercise their power over all types of firms, reshaping and transforming their businesses. Therefore, *satisfying customers' needs* has become the mission and purpose of every firm.

In order to survive in this new scenario, companies – both product- and service-centred – have to reinvent themselves and their offering in a way that allows the complete fulfilment of customer needs.

The alignment between *company offer* and *customer needs* involves a profound organizational culture transformation; because for customers it no longer makes sense to distinguish between tangible and intangible goods, the same has to become true for companies. Obviously, a firm's cultural shift requires a strategic change. Evidence of this is the development and dissemination of two new strategies, namely: *servitization* and *productization*, adopted by product-centred and service-centred companies, respectively.

Despite servitization having already been discussed in depth by scholars – starting from the milestone paper written by Vandermerwe and Rada in 1988 – there has been little discussion about productization. Thus, as it is becoming increasingly difficult to ignore the ongoing convergence and integration between manufacturing and service sectors, a deeper understanding of the productization strategy seems to be necessary.

Therefore, the purpose of this paper is to address the following research questions:

RQ1: How is productization defined in the existing academic literature?

RQ2: Can productization and servitization be considered as “two faces of the same coin”?

For the sake of clarity, it is important to highlight that a literature review on productization has already been conducted by Harkonen *et al.* (2015). However, the different aims and methods adopted limit the risk of the results overlapping.

Through a thematic analysis of 27 journal articles (identified by a systematic literature review), this paper aspires to move forward the body of knowledge on productization, while at the same time contributing to the servitization field.

Following this introduction, the paper has been divided into five sections: the first explains the methodology adopted; in the second section the descriptive findings are reported; the third section is devoted to the thematic analysis; in the fourth section, discussions, conclusions, implications and future research avenues are jointly presented.

2. Methodology

Having regard to the aim of this paper, this study is founded on a systematic literature review (SLR). This method – widely used in management literature (Crossan and Apaydin, 2010; Newbert, 2007; David and Han, 2004) – differs from traditional narrative reviews (Huff, 2009; Cooper, 1998) and can be considered the most suitable research approach in order to identify, review, and synthesize – in a transparent and rigorous way – all the literature currently available (Victor, 2008) on the productization topic.

The research process has been carried out following the three steps suggested by Tranfield *et al.* (2003), namely: planning, conducting and reporting. The first step has been devoted to the scope definition and protocol development. The conducting and reporting steps are, instead, accurately described in the next paragraph. In particular, the reporting phase has been divided in two sub-stages:

1. A descriptive analysis: to provide, through the use of graphics, simple summaries of the relevant literature (Sandelowski, 2000); and
2. A thematic analysis: to identify key themes between papers, in order to provide the major findings of the systematic literature review.

2.1. Search strategy

In order to identify the relevant literature related to productization, the search strategy was developed by first choosing the online research databases: i.e., “EBSCOhost”, “Scopus”, and “Web of Science”.

During the second phase, and according to their direct association with the topic analysed, the keywords were identified. To avoid the possibility of losing significant articles, all the possible grammatical forms and spelling differences of “productization” were considered.

The selected keywords within the chosen online databases allowed the identification of 788 papers.

In the third phase specific inclusion and exclusion criteria were applied (see Table 1).

Inclusion criteria	Exclusion criteria
Articles published in peer-reviewed journals	Articles containing the keywords only in the list of references or in the biographies
Articles written in English	Articles dealing accidentally with the selected topic
Articles published until December 2014	Articles showing a poor awareness of existing literature and/or a flawed research design

Table 1. Inclusion and exclusion criteria.

Moreover, the research results have been further refined considering the “document type” and “subject area” of the papers that were found. In particular, the former limit allows considering only “articles and reviews”, while the latter limit helps to refine the results coming from the following areas: “business, management and accounting”, “decision sciences”, “social sciences”, “economics, econometrics and finance”, and “environmental science”. Through the application of these restriction criteria, 307 potentially relevant articles were identified.

In the fourth phase, after removing any duplicates, the abstracts of all the articles were reviewed to ensure their relevance to the research goal. Careful reading of the abstracts resulted in the selection of 34 articles.

In the fifth phase, the full text of all the papers selected through the previous screening was read, corroborating the articles’ relevance to the research questions and aim. In particular, for determining the articles’ substantial relevance, the fit for purpose approach of Denyer *et al.* (2008) was adopted. Indeed, the dataset includes only those articles that were directly relevant to the research inquiry; this yielded a total of 24 papers.

Finally, both reference and citation tracking (i.e., the snowballing technique) were applied. The former requires scanning and crosschecking the list of all the 24 previously identified papers, while the latter identify articles that had cited those papers (Greenhalgh and Peacock, 2005). The first approach works back in time from the article, whilst the second approach works forward in time from that article, but both are useful in order to ensure that any other possible relevant publications were also captured. This allowed for the conclusive identification of a final dataset composed of 27 relevant articles.

The review procedure is summarised in Table 2.

Phase	Description	Articles
1	Selection of databases	788
2	Identification of keywords	
3	Application of restriction criteria	307
4	Removal of duplicates and reading of abstracts	34
5	Full-text reading	24
6	Snowballing technique	3
Final Dataset		27

Table 2. The systematic literature review process.

In line with Tranfield *et al.* (2003), the 27 identified articles have been deeply analysed through descriptive and thematic analyses, discussed in the following two sections.

3. Descriptive analysis

The descriptive analysis – through the use of graphics – offers a snapshot of the subject being studied, by simply summarizing the relevant literature (Sandelowski, 2000).

In particular, the 27 articles identified through the SLR have been analysed according to the year of publication, journal distribution, geographical distribution, and authors' contribution. Each category is hereafter discussed.

Articles by year of publication

Productization literature could be considered as in a nascent stage, and the publication trend – illustrated in Figure 1 – is proof in this sense.

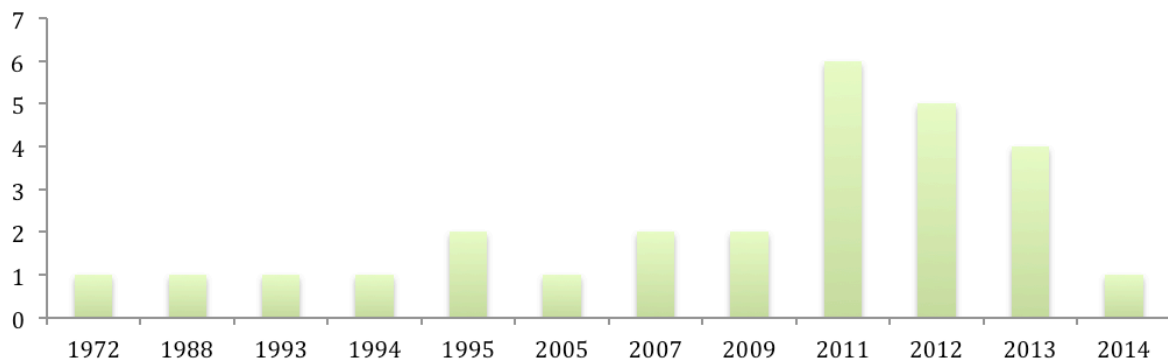


Figure 1. Time-line distribution of the papers.

In fact, starting from Levitt's paper, in 1972, it is only in 2011 that the academic interest towards productization shows any real expansion, reaching a peak of six publications in that same year. Despite this, in 2012 the trend starts to decline, until reaching only a single specific publication on the topic in 2014.

The scarcity of publications is not attributable to any specific explanation. For the sake of completeness, it is necessary to point out that there is much “grey literature” (i.e., academic literature that is not formally published, such as theses, conference proceedings, etc.) on productization (as demonstrated by the number of papers found in the first phase of the literature review process showed in Table 2). However, the rigorous methodology applied and the author's intention of ensuring the analysis is of a high quality grade, do not allow the inclusion of literature that has not been formally published.

Articles by source

Even though the productization literature is scarce, the subject is treated by scholars of different disciplines, therefore determining the involvement of 19 different journals for the 27 published articles (see Figure 2).



Figure 2. Journal distribution of the articles.

The different research fields (e.g., management, marketing, engineering, technology, etc.), in various ways are involved in the study of the phenomenon, let us therefore assume that the same will develop not only extensively but also comprehensively in the foreseeable future.

However, it is surely not a coincidence that the journal containing the highest number of publications is the *International Journal of Production Research*.

Articles by country

Not only many different journals but also a wide range of countries seem to be involved in the articles being published on productization.

Figure 3 shows a world map with the indication (given in percentages) of the number of publications from the various countries. The origins of the journal articles have been determined by the first author's affiliation.

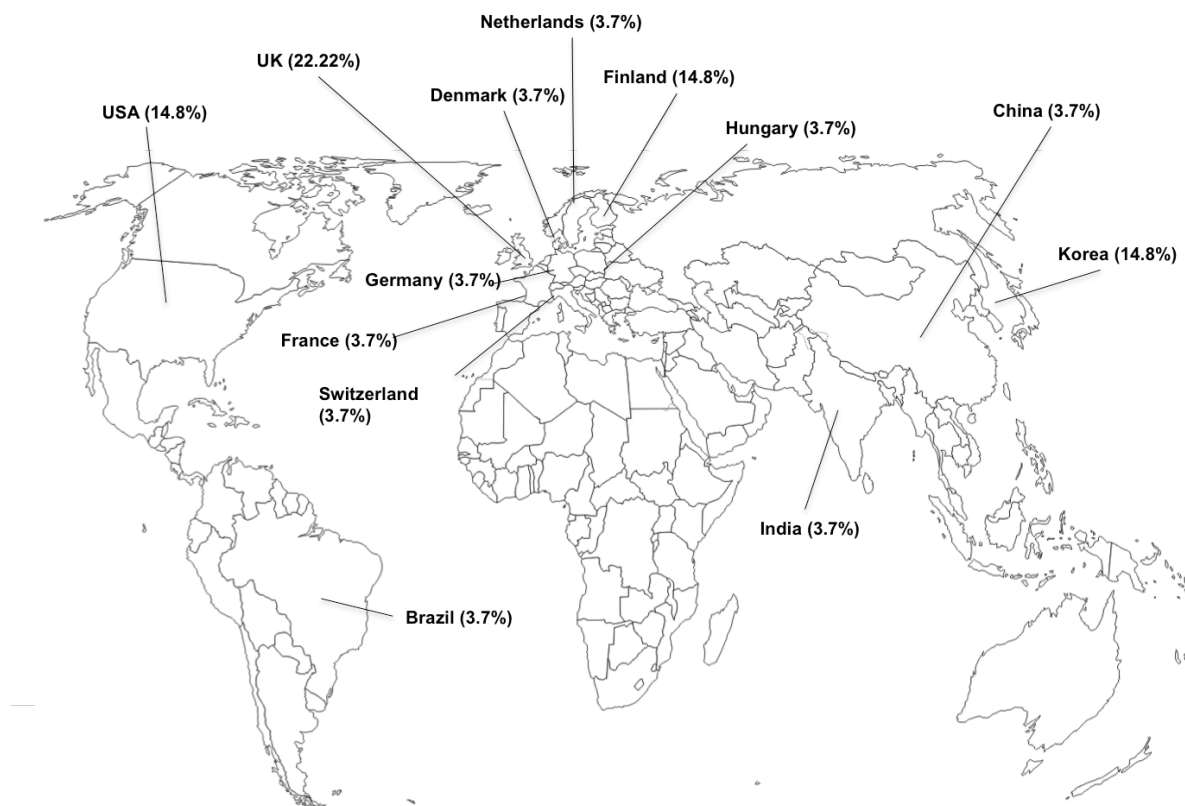


Figure 3. Country distribution of the papers.

The largest proportion of journal articles that refers to productization (almost 60%) were produced in Europe, while another 22% originates from Asia, and the remainder from America. The most involved country is the UK (more than 22% of articles) followed by Finland, Korea and the USA on a par (with almost 15% of articles).

Articles by author(s)

The last point is devoted to a descriptive analysis of the productization literature that deals with the number of authors that have contributed to the topic development.

A total of 79 different authors published articles on productization. Of these, only four authors appear in more than one contribution. They are: Durugbo, Geum, Lee S., and Park. In particular, Durugbo appears in two articles, one as sole author and one as first author. Geum, Lee S. and Park published, as co-authors, two articles (in both cases with Geum as first author). Finally, Geum and Park published together another article (in which, however, Park is the first author).

Also this last point – the absence of ‘leader author(s)’ – confirms what has been already said, namely that the productization literature is still in a nascent stage.

4. Thematic analysis

The main findings of this SLR emerge through the application of a thematic analysis approach to the dataset.

The thematic analysis approach allows an author to accurately describe a phenomenon (Daly *et al.*, 1997) and consists of the identification of common themes through “careful reading and re-reading of the data” (Rice and Ezzy, 1999, 258), “where emerging themes become the categories for analysis” (Fereday and Muir-Cochrane, 2006, 82). According to Braun and Clarke (2006), it is performed through six different phases: 1. familiarization with data, 2. generating initial codes, 3. searching for themes among codes, 4. reviewing themes, 5. defining and naming themes, and 6. producing the final report.

Due to the aim of this paper, the systematic theme’s development has been performed through the inductive (data-driven) approach (Boyatzis, 1998), according to which codes are derived bottom-up throughout the researcher’s reading of data.

Hence, through the codes that emerged, four themes have been identified and are hereafter presented and discussed. Table 3 shows the corresponding references for each theme, highlighting the contribution of each item to the subject through the use of a 3-points asterisks range (*=little contribution; **=medium contribution; ***=strong contribution).

Author(s)	Themes			
	Defining productization	Case studies	Productization features	Link(s) to servitization
Levitt (1972)	**	**	**	**
Vandermerwe and Rada (1988)	***	*		**
Reddy <i>et al.</i> (1993)	**			
Sundbo (1994)	**	*	**	**
Fincham (1995)	**			
Flamholtz (1995)	***		**	
Heusinkveld and Benders (2005)	**			
Baines <i>et al.</i> (2007)	***			**
Davies <i>et al.</i> (2007)		***		
Aurich <i>et al.</i> (2009)				***
Gallouj and Savona (2009)				**
Clayton <i>et al.</i> (2011)				***
Geum <i>et al.</i> (2011a)		**	***	**
Geum <i>et al.</i> (2011b)		**	***	
Jaakkola (2011)	**		***	
Ukko <i>et al.</i> (2011)	***			
Wang <i>et al.</i> (2011)				**
Alter (2012)		***		***
Chattopadhyay (2012)	***	***	***	*
Kim and Yoon (2012)				***
Park <i>et al.</i> (2012)	*			***
Valminen and Toivonen (2012)	***	***	**	*
Beuren <i>et al.</i> (2013)	**			**
Durugbo and Riedel (2013)				***
Nagy (2013)	***			**
Ritala <i>et al.</i> (2013)	**	**	***	
Durugbo (2014)		***		***

Table 3. Key themes identified in the productization literature.

4.1. Defining Productization

In order to understand the productization concept, the first theme has been devoted to the analysis of the different definitions given in the literature.

In the analysed literature, it is possible to find the first direct reference to the term productization in Flamholtz (1995, 42) who describes it as “the process of analyzing the needs of current and potential customers in order to design the products or services that will satisfy their needs” and it “includes not only the design of a product (defined here to include services as well), but also the ability to produce it”. This definition can be linked up to the claims by Vandermerwe and Rada (1988, 136), who – although not explicitly referring to the term productization – state that “the classic service companies [...] began to use more product to facilitate and deliver their services and take more control in the design specification of the products used to produce and deliver these services”.

After more than ten years, productization has been redefined by Baines *et al.* (2007, 4) as “the evolution of the services component to include a product or a new service component marketed as a product”. Since then different authors have also referred to it (e.g., Park *et al.*, 2012; Beuren *et al.*, 2013).

Authors such as Chattopadhyay (2012), Valminen and Taivonen (2012), and Nagy (2013) describe productization as the process of making the service offering more product-like through a systematization of its different components.

Nevertheless, there are other terms directly associated with productization. These are:

- “Technocratic thinking” (Levitt, 1972): in order to improve the services quality and efficiency, services companies must consider themselves to be manufacturers;
- “Modulization/modularization” (Sundbo, 1994; Ritala *et al.*, 2013): services are standardized through the creation of specific modules (one for each element of the services), which could be differently combined, depending on the customers’ needs;
- “Commodisation/commodification”: these terms originate from the consideration that ‘ideas’ could be marketed and consumed (Fincham, 1995; Heunsinkveld and Benders, 2005). In this vein, Ukko *et al.* (2011, 127) state that “productisation is a process in which an idea is developed into a marketable entirety that has highly standardised and well documented production phases and product elements”; and
- “Tangibilizing” (Reddy *et al.*, 1993; Jaakkola, 2011): the creation of a physical image of the service offering by adding to it some physical evidences.

Despite the different definitions and terms presented in the literature, they have different but common points that lead towards answering the first research question, and converging towards a more complete and detailed definition.

RQ1: How is productization defined in the existing academic literature?

A1: Productization is the process of transforming a service company offering by adding tangible products to core services or by decomposing service components into combinable modules, with the aim of fulfilling customers' needs and improving service quality and efficiency.

4.2. Case studies

The case study methodology is widely used in the productization literature and is devoted to the analysis of different types of companies (e.g., Davies *et al.*, 2007; Chattopadhyay, 2012; Alter, 2012; Valminen and Toivonen, 2012; Durugbo, 2014).

Sometimes cases are not deeply explored within a paper but they are presented as successful examples of productization practices (e.g., Levitt, 1972; Vandermerwe and Rada, 1988; Sundbo, 1994). Moreover, some of the cases analysed do not mention the company name, only its business sector (e.g., Chattopadhyay, 2012; Alter, 2012; Valminen and Toivonen, 2012; Ritala *et al.*, 2013; Durugbo, 2014).

An overview of the key examples is provided in Table 4.

Company	Source	Field	Productization process
Atkins	Davies <i>et al.</i> (2007)	Consultancy	It moves into integrated solutions becoming a systems integrator of externally supplied product components.
ATM (Automated Teller Machine)	Geum <i>et al.</i> (2011a) Geum <i>et al.</i> (2011b)	Bank	The use of technology to the banking system allows its automation, which evolved until becoming a self-service offering (production and consumption do not need to be simultaneous any more).
Cable and Wireless Global Markets	Davies <i>et al.</i> (2007)	Telecommunications	In their offering there were also product components (supplied by external manufacturers) and network facilities (provided in-house).
Danish ISS	Sundbo (1994)	Cleaning	The internationalization has been possible because the 'cleaning service concept' has been made recognizable through the standardization of some components.
DHL	Vandermerwe and Rada (1988)	Logistics	In addition to core services, they offer a high quality telex and laser-printing bureau. They designed their own computer and telecom network in order to track the parcels movement.
Hilton	Sundbo (1994)	Accommodation	Internationalization has been possible because the 'hotel service concept' has been made recognizable through the standardization of some components.
McDonald's	Levitt (1972) Vandermerwe and Rada (1988) Sundbo (1994)	Food	It industrialized its processes, making them highly structured and repetitive.
McGraw Hill	Vandermerwe and Rada (1988)	Printing and publishing	Customers have the possibility to mail order diskettes because core elements of services have been standardized.
UBS (Union Bank of Switzerland)	Vandermerwe and Rada (1988)	Bank	Technology has been used in order to create the first fully automated bank.

Table 4. Companies examples of productization.

The case studies allow considering different aspects related to the productization, both in terms of theory and practice.

First of all, it is interesting to note that only one unsuccessful case is presented in the literature, i.e., Cable and Wireless Global Markets: “It was unable to force its internal regional business units to relinquish control of profitable corporate accounts and faced strong competition from major systems integrators” (Davies *et al.*, 2007, 190). This leads to two possible considerations: 1. The productization process is (almost) always a successful strategy; or 2. The literature lacks a deep analysis of the phenomenon. Considering the relatively young age and paucity of contributions related to productization, it is possible to consider as valid the second assumption.

Secondly, McDonald's, ATM and small-KIBS (Knowledge Intensive Business Services) companies are those most considered by authors when referring to productization practices. Thus, leading practices in the adoption of productization can be found both in small and large companies. This can be considered a clear sign of how all service companies – whatever their size – recognize the need to make changes to their offering. Moreover, the fact that even small businesses are able to put in place productization strategies might suggest that this process does not require huge monetary investments. Unfortunately, the lack of quantitative studies in the literature (devoted to the measurement of costs linked to this practice) does not provide answers; although this does offer a great opportunity for future research development.

4.3. Productization features

Despite productization literature not having been extended so far, it is already possible to identify some specific features, together with their mutual relations.

The adoption of a productization strategy by a service firm implies the creation of a ‘new service offering’. According to Ritala *et al.* (2013), this involves two phases: a) service-offering visualization, and b) service-offering modelling and modularization. In order to perform these phases, Jaakkola (2011, 224) suggests “three key practices: (1) specifying and standardizing the service offering, (2) tangibilizing and concretizing the service offering and professional expertise, and (3) systemizing and standardizing processes and methods”. The adoption and implementation of these practices inevitably produce changes in ‘*the way of being and doing*’ of the company. Such changes could be facilitated by the adoption of technology. In particular, if the new service offering includes tangible products, technology can act as an interface between them – especially in the design phase (Geum *et al.*, 2011a and 2011b). Moreover, “the increased use of technology has the consequences that service production becomes more like manufacturing” (Sundbo, 1994, 253), and this occurs both with hard and soft technologies (Levitt, 1972). Once the new service offering has been developed, the efficiency and success (Valminen and Toivonen, 2012) of the productization strategy depends on the “firm’s success in defining its market segment and potential niche” (Flamholtz, 1995, 42). The correct formulation both of the new offering and the competitive positioning is reflected – with a positive effect – on firm performance. Productization benefits have been clearly stated by Chattopadhyay (2012, 198): “Service companies attempt Productisation of service for improving competitiveness and performance. Defining, systematizing and concretizing a service make its production more profitable and efficient. When the production process is well defined, the quality of the service becomes more stable. In addition, the possibilities to

accumulate knowledge systematically are improved. Productisation often intensifies the transfer of knowledge and enables the division of work. Finally, Productisation makes the pricing of the service easier". Obviously, achieving these results is positively and inevitably reflected in the customers' satisfaction and loyalty.

Each aspect encompassed in this theme, due to its importance, need to be further and deeply explored in the future.

4.4. Link(s) to servitization

In order to answer the second research question, the last themes collect all the articles in which it was possible to identify links between productization and servitization. In particular, it is interesting to point out that connections have been found in 18 journal articles (out of 27), corresponding to 67% of the literature analysed. This preliminary finding allows the author to state that productization and servitization are strictly related but the existence of the link is not sufficient to determine if productization could (or not) be regarded as the opposite approach of servitization. Thus, the 18 articles included in this last theme have been fully and deeply explored.

First of all, in the academic discussion it is possible to identify three levels of convergence; i.e., between sectors (service and manufacturing), offerings (services and products), and strategies (productization and servitization). Table 5 shows the corresponding authors for each convergence level, with related statements.

Level of convergence	Author(s)	Statement
Sectors	Levitt (1972)	"they [service companies] must think of themselves as performing manufacturing functions [...] only then will they begin to make some significant progress in improving the quality and efficiency of service" (p. 42)
	Vandermerwe and Rada (1988)	"manufacturers and service companies are thinking and behaving like one another" (p. 321)
	Sundbo (1994)	"similarities between the organizational forms of the firm in the two sectors" (p. 261)
	Wang <i>et al.</i> (2011)	"the traditional boundary between manufacturing and services is becoming increasingly blurred" (p. 6865)
Offerings	Gallouj and Savona (2009)	"the boundaries between goods and services become more blurred" (p. 162)
	Clayton <i>et al.</i> (2011)	"the consideration of the product and service as a single offering" (p. 2)
	Geum <i>et al.</i> (2011a)	"integration of products and services has been a matter of grave concern for both manufacturers and service providers" (p. 129)
	Nagy (2013)	"services will increasingly behave as physical products [...] in contrast, physical products incorporate more services than before" (p. 103)
Strategies	Aurich <i>et al.</i> (2009)	"servitization of this product [...] reverse approaches implementing productization of services" (p. 593)
	Alter (2012)	"ideally, servitizing should be treated symmetrically with productizing" (p. 27) "servitizing and productizing should be viewed as opposite strategy directions" (p. 29)
	Kim and Yoon (2012)	"many manufacturers [...] are trying to change their business model through servitization [...] similarly, service providers are also making efforts to deliver high quality of services to customers by productization" (p. 324)
	Durugbo and Riedel (2013)	"servitization closely connects and integrates services with offered products for servitized products, whereas productisation does the reverse for offered services" (p. 599)
	Durugbo (2014)	"servitization [...] and productization that does the reverse" (p. 2885)

Table 5. Levels of convergence in the academic discussion.

The link between productization and servitization has been recognized by scholars and can be regarded as the result of the existing correlation and convergence between service and manufacturing sectors, on the one hand, and services and product into a single offering, on the other.

The above-mentioned integration between services and products into a single offering entails also taking into account a part of the studies dealing with the product-service system (PSS) concept. In particular, the existence of a link between the three research communities (i.e., productization, servitization, and PSS) can be noted by examining these concepts' definitions:

- Servitization: “bundles consisting of customer-focused combinations of goods, services, support, self-service, and knowledge” (Vandermerwe and Rada, 1988, 316);
- Product-service system: “a marketable set of products and services capable of jointly fulfilling a user’s need” (Goedkoop *et al.*¹, 1999, 18);
- Productization: the process of transforming a service company offering by adding tangible products to core services or by decomposing service components into combinable modules, with the aim to fulfil customers’ needs and improve service quality and efficiency.

The three definitions have two important common points: 1) creating an offering that simultaneously combines products and services; and 2) creating an offering that will satisfy customers. In this sense, the assumption of Baines *et al.* (2007) and Beuren *et al.* (2013), which considers PSS as a special case of servitization, seems not to be valid any more. The PSS concept cannot be restricted to manufacturers’ offering; it also seems usable for service companies (e.g., Clayton *et al.*, 2011; Kim and Yoon, 2012). On the other hand, it can be useful to define new terms, as Park *et al.* (2012) do. They define “integrated product-service” (IPS) as “any offering in which products and services are integrated, regardless of its type(s), objective(s), and feature(s)” (p. 529).

The verified relationship among the three research communities also reinforces the already verified lack of literature specifically dedicated to productization. In this sense, it is worth noting that of the 18 papers considered within this theme, only two are exclusively devoted to productization (i.e., Chattopadhyay, 2012 and Valminen and Toivonen, 2012).

Moreover, by analysing only the articles that jointly consider productization and servitization, it is possible to identify which kind of relationship scholars recognize between the two concepts. The adjective most used to describe this relationship is “reverse” (Aurich *et al.*, 2009; Durugbo and Riedel (2013); Durugbo, 2014). Thus, productization is seen as the exact opposite of servitization, and this answers the second research question.

¹ The article by Goedkoop *et al.* (1999) is not included in the 27 journal articles derived from the SLR. It has been cited here due to its importance to the context.

RQ2: Can productization and servitization be considered as “two faces of the same coin”?

A2: Productization and servitization can be considered as “two faces of the same coin”. In particular, positioning manufacturers and service companies at the far ends of an imaginary continuum, servitization and productization strategies acting reversely lead to the convergence of firms’ offering and sectors.

5. Discussion and Conclusion

This study set out with the aim of assessing the importance of productization practice in the modern economy.

The application of a thematic analysis to 27 journal articles – derived from a systematic review of the literature on the topic – allows us to clearly define the productization concept and its relationship with servitization.

In particular, productization has been defined as the process of transforming a service company offering by adding tangible products to core services or by decomposing service components into combinable modules, with the aim of fulfilling customers’ needs and improving service quality and efficiency. Moreover, productization and servitization can be considered as “two faces of the same coin”, which acting reversibly lead to the convergence between manufacturers and service companies.

The overall understanding and specific findings of this research have both practical and theoretical implications.

Firstly, the analysed journal articles show that the productization concept is still not well established within academic discussion, so much so that it is not possible to identify a specific research community dealing with this topic. More productization-specific studies are needed and significant work remains to be undertaken.

Even though a wide range of future research questions can be posed, there are at least three specific aspects that – more than others – need to be addressed:

- Customer role (e.g., changes to customer participation in the offering creation);
- Design issue (e.g., engineering aspects related to the practical combination of tangible and intangible goods); and
- Guidelines (tools and techniques) for managers (e.g., empirical investigations in order to provide best practices).

Secondly, the conducted research seems to suggest the existence of a new type of firm, namely the solution provider, shown graphically in Figure 4.



Figure 4. The solution provider firm.

Both manufacturing and service companies are facing important transformation processes, in order to maintain a successful competitive position. This requires the implementation of new strategies and changes in the offering provided. Practically: the application of servitization and productization processes by product- and service-based firms, respectively; and the simultaneous presence of tangible and intangible goods into a single offering. Therefore, it is possible to state that firms have to provide *solutions* (the main purpose of the new offering is to solve a consumer's problem, regardless of what it is). Servitization and productization strategies perform this task. Along the axis, each level of service/product infusion generates a new offering capable of fulfilling a specific customer requirement.

As a result, achieving a successful competitive position will be possible only through the creation of a balanced mix of products and services according to the customer expectations.

Although this study has been conducted in a rigorous manner, it contains several limitations, and – as with all research methods – is susceptible to critical observations. Limiting sources to peer-reviewed journals – even though increasing the validity of the investigated articles – does not allow for the exploration of the contribution on productization available in other publication media. Moreover, the adopted inclusion and exclusion criteria, together with the selected keywords, may also have influenced the results.

Due to the extensive search possibilities still open, the increased knowledge on productization topic gained through this study represents only the first step towards a deeper and more complete understanding of the phenomenon.

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Standardizing the service delivery system for repetitive industrial services

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Manufacturers need to develop efficient service deliveries that can be used for multiple customers with different equipment. The service delivery system can support service repetitiveness through standardization. The objective is to increase understanding on features and requirements of standardization in the service delivery system and identify means for efficient service delivery in triadic settings. The qualitative multiple-case study with three manufacturing firms reveals different relevant factors for standardization for reactive and proactive services and highlights certain practices in triadic customer participation. Equipment and remote technologies both challenge and enable standardization and require new competences.

1. Introduction

In order to produce industrial services efficiently for multiple customers with multiple pieces of equipment including different technologies, a manufacturing company has to develop its service delivery system carefully. According to Roth and Menor (2003) different service concepts and markets require different management and service design approaches. They propose a framework for studying service operations management issues (Roth; Menor, 2003). This framework enlightens the critical aspects in service delivery systems. Ponsignon et al. (2011) have used this framework to develop service delivery system design characteristics and contingencies.

The efficiency of a service delivery system requires that the system is standardized at some level. Standardization in service delivery means the use of generalized processes to multiple customers and services with little or no customization. It also refers to the means companies use to systematize their service deliveries. Standardization may imply a tradeoff between customer satisfaction and efficiency. The challenge is to manage service quality and productivity at the same time (Wang et al., 2010).

Competitive performance includes outcomes of cost, quality, flexibility and cycle time (Jacobs et al., 2007), and standardization can be a means to improve these performance measures. Service process designs, service modularization, and e-service systems have been studied both in industrial and knowledge-intensive service contexts already (Carlborg; Kindström, 2014). Even if service repetitiveness for diverse customers is a priority to suppliers, previous research has not covered standardization in service delivery systems sufficiently.

As industrial service business becomes global, the complexity of customers' demands in multiple channels increases and the entry of nontraditional competitors in

markets are possible (Roth; Menor, 2003). For example a supplier may enter into competition with its customers in service business, if it takes increased responsibilities as part of customers' processes. Customers' needs have become more heterogeneous and diversified (Bask et al., 2011). Also the service deliveries are more complex and there are multiple parties involved. Companies have to be able to manage the service delivery system, including various structural, infrastructural and integration choices (Roth; Menor, 2003).

When moving towards service business, the supply chain often changes into a network. A triad, i.e., collaboration of three companies, is the smallest example of this network setting (Choi; Wu, 2009). By examining triads the relationships between different players and their power positions can be researched. The understanding of a supply network phenomenon has been limited by the lack of empirical evidence of managing different triads (Peng et al., 2010). In particular, there is a research gap concerning the service production to end users in service triads. More knowledge is needed on how industrial companies can promote industrial services towards customers in a triadic setting with third parties such as equipment dealers and logistics providers. In this research we are examining how a manufacturing firm acts in a triad and how it can promote service production for end customers.

The purpose of this study is to examine the standardization of service delivery systems when producing industrial services to customers in a multi-equipment environment. The goal is increased understanding on features and requirements of standardization in the service delivery system, and particularly manufacturing firms' roles in service triads in such systems. The research analyzes the need for standardization caused by multiple customers, multiple pieces of equipment and multiple technologies embedded in the equipment. The study focuses on three research questions:

- 1) What are the critical features requiring standardization in manufacturing firms' service delivery systems?
- 2) How do manufacturing firms manage customer participation and end-customer information in service production?
- 3) How do manufacturing firms use technology to promote service delivery system standardization?

The study is focused on manufacturing firms and their service delivery systems towards customers in global, industrial settings. The settings are characterized with complexity: each piece of equipment is unique, the customers are multi-equipment and multi-service users, and various third parties may be involved, including dealers, external service providers, and software firms.

2. Literature review

Service sector grows fast and many manufacturing companies are transforming their business towards service-dominant logic. This means that the nature of value creation transforms. Producers and customers do not have separate roles anymore but they are co-creating value in their interactions (Vargo; Lush, 2008). The customer value does not depend merely on the main product anymore. The relationships be-

tween the supplier and customer in order to ensure the product's effective use are also affecting the customer value. (Grönroos, 2011)

The configuration and design of the service delivery system is the way to provide the target customers the service concept and the value proposition. This part of the service business' competitiveness is contingent (Verma et al., 2002; Johnston; Clark, 2005). To achieve expected levels of performance in overall profitability and customer satisfaction, an alignment has to be found between target market, service concept and service delivery system design (Ponsignon et al., 2011; Roth; Menor 2003).

According to Roth and Menor (2003), companies need to consider their strategic choices in target market, service concept and service delivery system design that are linked with each other through service encounters. The target market is related to selecting the right customer. The service concept consists of two parts: core service and peripheral services. The peripheral services supplement the core service and offer additional benefits that add value for the customer. The service delivery system is the process how the service is delivered to the customer. (Roth; Menor, 2003) It includes for example the technology, equipment, procedures, people and management that are needed in the service delivery (Heskett, 1987). The focus of this study is in service delivery systems.

2.1. Service delivery system design

In the design of service delivery systems, the extant literature emphasizes the role of technology, people, equipment, facilities and layout, location, and processes and procedures (Heskett, 1987). Ramaswamy (1996) discusses the matter in a more general way. He proposes that the service delivery system design choices are related to the service delivery processes and the facilities where the service is produced. Roth and Menor (2003) divide the strategic service delivery system design choices into three aspects: structural, infrastructural and integration choices. The structural choices relate to facilities and layout, equipment and technology, and service product-process interfaces and capacity planning. The infrastructural choices concern such issues as practices, people, performance systems, policies and processes. Finally the integration choices relate to operations coordination and organization, service supply chains, learning and adaptive mechanisms, and integration technologies. (Roth; Menor, 2003)

Ponsignon et al. (2011) have used Roth and Menor's service strategy framework in an empirical study with a market leading electricity supplier in UK. As a result they propose service delivery system design characteristics and contingencies. The nature of the target market and the service concept affect the service delivery system design. Customer requirements can either be heterogeneous or homogeneous. The service concept can be highly customized or standardized. It can be typified by contract with configurable parameters and the nature of customer relationship. For example level of technical and interpersonal skills, potential of automation, level of employee discretion and routineness can be higher or lower depending of the nature of the target market and service concept. Also the delivery process is affected and it can be either decoupled or coupled. (Ponsignon et al., 2011)

An important part of service delivery is the supplier's cooperation with subcontractors and various other parties. The service supply chain is a network of suppliers, service

providers, consumers and other supporting units that performs transaction functions of the resources needed in the service production. It also performs the service deliveries and changes the resources into core and supporting services. (Baltacioglu et al., 2007) According to Ellram et al. (2004) service supply chain management is process, information, service performance, funds and capacity management throughout the whole chain. Service supply chain management is a critical aspect to ensure the efficiency and the profitability of service production. Services also differ from products in such ways that traditional supply chain management has to be revised to meet the requirements services cause.

2.2. Standardization of service processes and supply chains

When a company produces services to multiple customers in a multi-equipment environment, standardization of the service delivery system is needed to some extent. Some important issues in service delivery system standardization can be found from previous research. A summary of relevant previous research is shown in Table 1, and key issues are discussed further.

Formalization vs. flexibility in service processes. Wemmerlöv (1990) and Carlborg and Kindström (2014) divide service processes into rigid and fluid processes. According to Carlborg and Kindström (2014) the rigid processes are standardized and they do not require a high level of information exchange between the customer and the supplier or technical skills. The rigid processes are also highly centralized and formalized. The fluid processes on the other hand are customized and a high level of information exchange and technical skill are required. Also Ostrom et al. (2010) propose same kind of classification. According to them services can be designed to be flexible, dynamic and created together with the customer or rigid, standardized and produced without customer participation. However, in many cases the suppliers customize their services even though they have a modular service portfolio. This kind of behavior complicates the standardization of service delivery system. Nevertheless in order to be efficient, the supplier should aim to standardize its service processes to some extent.

Service concept and process modularity. Earlier research has already shown that service concepts may be highly standardized, whereby the customer-specific delivery of services may be supported through the use of modular service components (Jacobs et al., 2007). Roth and Menor (2003) divide the service concept into core service and peripheral services. The core service has five elements: supporting facilities, facilitating information, facilitating goods, explicit services and implicit services. The peripheral services are supplementary to the core service and they offer additional value-adding benefits for the customer (Roth; Menor, 2003). When a company creates new services in addition to their core product business, they have to balance meeting of the customer needs and acceptable level of service development efficiency (Carlborg; Kindström, 2014). As customer needs are becoming more diversified and heterogeneous, this may hinder the balancing of those aspects (Bask et al., 2011). Modularization can be used to manage the balance between the customer needs and efficiency.

In modularization an object is divided into components. These modules then can be combined differently and thus create customizable offerings (Carlborg; Kindström, 2014). In service business there is often a process point of view into services. When

using this viewpoint, service is a mixture of physical and non-physical elements. Different customer-specific configurations can then be created by integrating these elements. (Davies et al., 2007; Pekkarinen; Ulkuniemi, 2008)

Table 1: Summary of previous research and its gaps concerning standardization in industrial service delivery systems.

<i>Viewpoint to standardization and key sources</i>	<i>Key conclusions; possible gaps</i>
Formalization vs. flexibility in service processes Wemmerlöv, 1990 Carlborg; Kindström, 2014 Ostrom et al., 2010 Carlborg; Kindström, 2014 Yu; Zhang, 2008	Services can be designed to be flexible, dynamic and co-created with the customer or rigid, standardized and produced by the supplier only. Flexible service processes cause requirements for technical skills and tasks vary highly, rigid service processes are highly formalized and task variety and the level of technical skills are low. Industrial service process is related to the production planning, customer demands and maintenance demands. Because predicting the exact sequence of a service process is often impossible, the process must be flexible in order to be able to answer changes in the three aspects. <i>Gap: How can co-created service processes be standardized to increase efficiency?</i>
Service concept and process modularity Johnston; Clark, 2005 Roth; Menor, 2003 Davies et al., 2007 Pekkarinen; Ulkuniemi, 2008 Bask et al., 2011	Service concept includes the way of service delivery, customer's direct service experience, the service outcome and the value of the service. Service concept is based on core service and peripheral services. Service process is a mixture of physical and non-physical elements. Customer-specific configurations can be created by combining these elements. Customization can be achieved on a higher level by breaking down processes into standardized sub-processes. <i>Gap: How can process modularization be used in effective service deliveries?</i>
Supply chain reference models Croxtton et al., 2001 Croxtton et al., 2001 Ellram et al., 2004 Baltacioglu et al., 2007	SCOR model is a tool for charting supply processes and activities. It considers services as process driven. GSCF model is based on a supply chain with three elements: the business processes, the management components and the structure of the chain. Ellram et al.'s model includes five parties: supplier, purchasing, internal user(s)/stakeholders, finance and ultimate customer. Management issues through the chain refer to capacity, demand, customer and supplier relationships, service delivery and cash flow. The IUE-SSCM combines SCOR model and Ellram et al.'s model. It has three main parties: the supplier, the service provider and the consumer. <i>Gap: How can understanding the service supply chain ease standardization of the delivery related processes?</i>
Customer participation Carlborg; Kindström, 2014 Xue; Harker, 2002 Tuunanen; Cassab, 2011	There are three different production modes: firm production, customer production and joint production. Customer participation in service production has mainly been viewed as minor and supplementary. In a few existing studies that have usually an internal supplier-oriented point of view, the customer's co-producing role is often neglected. <i>Gap: How does customer participation affect the service delivery system and how can it be managed?</i>

Supply chain reference models. Consulting firms and information system providers have developed various modular reference guides to promote the design of standardized product and service processes in companies. Ellram et al. (2004) combine the SCOR (Supply Chain Operations Reference) model and the GSCF (Global Supply

Chain Forum) framework to create a service supply chain model. The SCOR model is a tool for charting supply processes and activities. The GSCF framework conceptualizes supply chain through three features: the structure of the chain, the management components and the business processes. (Croxtan et al., 2001) Ellram et al.'s service supply chain consists of five main parties. These are supplier, purchasing, internal user(s)/stakeholders, finance and ultimate customer. The management issues through the chain relate to service delivery, capacity, customer relationship, supplier relationship, demand and cash flow. (Ellram et al., 2004)

Baltacioglu et al. (2007) introduce a framework for service supply chains called the IUE-SSCM (Izmir University of Economics Service Supply Chain Model). The IUE-SSC model is based on the SCOR model and Ellram et al.'s model. It has three main stakeholders in the service supply chain: the supplier, service provider and consumer. In the model, information flow and technology management are important issues through the chain. Service delivery happens between the service provider and the consumer or between the supplier and the consumer. Also this model has several management issues related to demand, capacity and resources, supplier relationship, service performance, order process and customer relationship. All of these management issues have their own sphere of influence in the chain. (Baltacioglu et al., 2007) By using these kinds of models companies can understand better the natures of service supply chains. Also Ellram et al. (2004) highlight that their model can be used to notice red flags of hidden cost sources in the service supply chain. The IUE-SSC model has been implemented to the healthcare industry which is facing notable growth with increasing costs. To be able to manage the growth and the costs, service supply chain management is vital for the industry. In this context the IUE-SSCM was successful tool for identifying important managerial aspects. (Baltacioglu et al., 2007)

2.3. Customer participation in service deliveries and service triads

One distinct feature in service production is customer participation. The dominant understanding is that the supplier and the customer both participate in the joint production of the service (Carlborg; Kindström, 2014). Customer participation increases the variation in the system and makes demands on the facilities, technology and design of staff (Safizadeh et al., 2003). In many cases the supplier cannot avoid customer's participation in the service delivery system (Zomerdijs; de Vries, 2007). This means that one critical aspect in the service delivery system standardization is the customer's role and it has to be considered when the company develops standards and standardized processes.

In the existent literature on industrial services, customer participation in service production has mainly been seen as supplementary and minor (Carlborg; Kindström, 2014). Also the customer's cooperation role in service production is often neglected (Xue; Harker, 2002). Customer participation in service production is, however, a reality and companies have to be able to manage it well to achieve efficiency in the service delivery system.

Service delivery in supply networks implies that multiple parties may be involved in service delivery. Service triads engage suppliers, customers and certain third parties into service delivery (e.g. Wu; Choi, 2005). Dubois and Fredriksson (2008) and Wu

and Choi (2005) have studied triadic networks where one buyer interacts with two suppliers. Dubois and Fredriksson (2008) propose a type of sourcing called “triadic sourcing” where the buyer utilizes a joint sourcing strategy for two distinct suppliers, based on a single case study in car industry. Wu and Choi (2005) concentrate on supplier-supplier relationships in their research, using a multiple case study in eight companies from different industries. They define archetypes of these relationships in triadic networks. Rossetti and Choi (2008) have surveyed triadic networks where the supplier interacts with an intermediate player and an end customer in commercial aerospace industry. They focus on a phenomenon where the supply chain disintermediation takes place between the supplier and the customer (Rossetti; Choi, 2008). The third type of triadic network is a chain where one supplier interacts with two buyers. Choi and Kim (2008) have done a literature review of this kind of a network. They highlight the importance of structural embeddedness in a buyer-supplier relationship. This means that the buyer should evaluate its suppliers in the network context and not in isolation.

Peng et al. (2010) have taken a different kind of approach into triads. They identify six types of triads from which they chose three and focus on them, based on their specific research sample. These three triads are as follows:

- 1) The company has a bridge role in the triad which means that it is connected to two disconnected partner companies.
- 2) The company has a peripheral role in triad. It is connected only to one of the connected partners.
- 3) The company has an equal role in the triad. All the companies are connected to each other.

In this research we are especially interested in such a triadic setting where the supplier has a peripheral role. The supplier sells its products to the end customers via distributors or integrators. We are inspecting the means that the supplier has to promote the service sales to these end customers. When using these kinds of sales tactics, the supplier in many cases does not know the end customer. This complicates the supplier’s service production and after sales opportunities.

2.4. The role of technology in service deliveries

In the past decades, the rapid development of information and communication technologies and the internet has had enabled standardization both in service processes and products. Such technological developments for example enable companies to collect data and keep record of their installed base remotely at the customers’ locations efficiently (Jonsson et al., 2009). Remote monitoring is done by adding sensors into the equipment. These sensors produce real-time data about the equipment that can for example be related to signs of breakdown, current status or unusual use of the equipment (Westergren, 2011). The companies can use this kind of data to develop and offer new services to their customers, including preventive maintenance and optimization services.

The sensors are placed on the critical components. When remote monitoring system (RMS) is installed in multiple factories, the manufacturer has an opportunity to collect and analyze data from several components and production systems across organiza-

tional boundaries. (Jonsson et al., 2009) RMS provides also other benefits for the manufacturer. By monitoring the components and equipment the manufacturer is able to track where its pieces of equipment are. Also the knowledge about the products increases, which enables the manufacturer to predict and identify its customers' service needs. (Jonsson et al., 2009) This is a major competitive advantage for the manufacturer as it is essential for the service provider to understand its customers' needs.

To sum up, the above literature review has scanned the key issues relevant to standardizing the service delivery systems. Earlier research has largely focused on the design parameters of service delivery systems inside manufacturing firms and drawn attention to flexible and rigid processes. To complement previous research, we have highlighted the importance of the customer's and network's role as part of standardization efforts, as well as the role of modern remote technologies. Customer participation in service production has been noted in the literature but its effects on the service deliveries have to be studied more, particularly in demanding industrial contexts. Also the ways to manage the customer participation in the service context is an important issue that needs to be enlightened more, particularly when various information and remote technologies are used, to monitor the installed base of equipment.

3. Research methods

3.1. Research design

This research was conducted as a qualitative multiple case study. According to Yin (2009) a case study is a suitable method when the aim is to understand a real-life situation holistically. The case study can also be used to collect knowledge of a group, individual or phenomenon (Yin, 2009). The benefit of a multiple case study is that the results of the first case can be verified in the next cases.

In this research three manufacturing companies were studied. All the case companies are product oriented and active in the engineering industry. In order to maintain the anonymity of the companies, they are called CompanyA, CompanyB and CompanyC. Table 2 offers background information of the case companies.

All the case companies operate in a global environment. They are product-oriented manufacturing companies, with a primary focus on the delivery of fairly complex technology-based systems and recent expansion of offerings into industrial services. At the moment all the companies are showing an interest in remote services. However, only CompanyC is actively selling these kinds of services at the moment and even in their case remote services play a minor part.

The biggest differences between the case companies are their customer bases and service processes. Every company has their own working methods and different technological systems. Also the technology embedded in their equipment causes variation between the companies and their service deliveries.

Table 2: Information of the case companies

	<i>CompanyA</i>	<i>CompanyB</i>	<i>CompanyC</i>
The nature of the industry	Mostly project deliveries but also transactional deliveries. Focus area is component manufacturing.	Mostly project deliveries but also transactional deliveries. Focus area is assembly manufacturing.	Mostly project deliveries. Focus area is both component and assembly manufacturing.
Typical customers	Customers vary from company clients to consumers	Customers vary from small to big companies	Customers vary from small to big companies
Service offering	Traditional product related services, consulting	Traditional product related services, process integration and optimization	Traditional product related services, process improvement
Net Sales (million euros)	>30000	<5000	<5000
Number of employees	>100000	>10000	>10000

3.2. Data collection

The data collection was done using multiple methods. In this research semi-structured interviews were used as the primary data collection method. The interview outline development was based on the literature review and the general information of the case companies. The interview outline included similar questions for all the case companies. However some modifications were made depending on the case companies. The main themes of the interviews were: service delivery processes, the company's customers and their role in service deliveries, service delivery system standardization, sales processes, customer interaction, remote data collection and background information. The service delivery process theme included questions for example about the structure of the process, its level of standardization and the participants involved in the process. The customer's role theme had topics such as communication between the supplier and the customer, customer's participation in the service delivery and customer satisfaction. Questions about sales processes on the other hand were related to the order-delivery process, cooperation of product and service sales teams and sales tools.

In total, 19 interviews were performed. Five interviews were carried out in CompanyB and seven interviews in both CompanyA and CompanyC. They lasted between 25 to 111 minutes (53 min on average). The persons that were interviewed were working mostly in middle management in service business related operations. All the interviews were audio recorded and transcribed. Most of the interviews were conducted at the case companies' premises and some at the university premises. This offered also an opportunity to learn about the interviewees' working environment and to observe the premises and working habits.

Observation and documentation provided by the company were used as secondary data collection methods in the CompanyA. The company's repair shop's operations - the repair process, personnel's working habits and the facilities - were observed.

They also offered some documentation about their service processes and information systems. These documents were mainly presentations and the documents were used to acquire a complete understanding about the company's services and service processes. This was analyzed and used in the research for purposes of validation.

3.3. Data analysis

Data analysis included several steps. The audio-recorded interviews were transcribed by an external service provider. The first author reviewed the transcripts to find and correct mistakes and gaps. After this, the data was categorized. The categorization was thematic and based on the interview structure.

Each company's data was initially analyzed separately before a cross-case comparison. The aim was to develop case-specific results as well as to find the similarities and differences between the case companies. Workshops were held with all the case companies to discuss the case-specific results and get feedback from them. The aim of these workshops was also to ensure the correctness and validity of the results. Additionally, the case-specific narratives were sent to the company contact persons, for validation and potential corrections. After the feedback of the companies, a cross-case analysis was made to compare and combine the results. The analysis was inductive within the core themes, enabling the emergence of key issues unique to the case contexts. Excerpts from the interviews and cross-tabulation are used in the Results chapter to demonstrate the key findings.

4. Results

4.1. The case companies' service delivery processes and their standardization

There are similarities and differences between the case companies regarding their service delivery processes and how well they are standardized. All the case companies use ERP systems to standardize the steps in their service deliveries. However, the interviewees have identified various needs for improvement, and a need for further standardization can be noted. According to the interviewees, particularly the reactive service deliveries and communication with the customer include good potential for enhanced standardization.

All the case companies have both reactive and proactive services in their service portfolio. The service delivery systems vary between these service types. In case of reactive services, interviewees in all the case companies noted several domains in which standardization could be enhanced. The issue most commonly mentioned by interviewees is problem solving concerning the equipment in the customer's use. It can take a long time and it requires sufficient background information from the customer. A manager at one of the case companies highlighted: *"We have to know so much about the situation that we can send that kind of maintenance technician there who can audit the right piece of equipment."* This means that communication with the customer is important for the service delivery. Another manager noted that when a maintenance technician faces a piece of equipment that is not familiar to him, the

problem solving is challenging and it can take a long time. In general, allocating the right resources for the right tasks is a relevant resource management issue that requires planning and anticipation.

In the proactive services, interviewees reported good experiences with managing the service delivery systems. A manager explained: *“We know at least two months before the time of the delivery, how long it will take and what is the size of the team we are going to send to the customer’s premises.”* When the service deliveries are planned and scheduled beforehand, the uncertainty of the service delivery system decreases. For example spare and wear parts can be ordered straight to the customer’s premises depending on the service and the expected time the delivery requires decreases. Yet, the case companies have also different challenges regarding the proactive services. The identified factors relevant to standardization in the case companies’ delivery of reactive and proactive services are summarized in Table 4.

Table 4: Factors to be taken into account in standardization in different service type deliveries, as identified in the interviews

<i>Challenges in reactive services</i>	<i>Challenges in proactive services</i>
<ul style="list-style-type: none"> • Service delivery system variation case-by-case • Resource management • The costs increase • The delivery time increases • Defining the problem and its cause • Unexpected changes in the service specifications 	<ul style="list-style-type: none"> • Unique challenges, depending on the service, customer, context and other factors • Customer participation in information collection • Unexpected changes in the customer’s premises or the environment where the delivery takes place • Spare parts are not at the right time at the customer’s premises even though ordered in time

Particularly in proactive services, the pursuit of standardization faces different factors in the manufacturing firm’s delivery system, varying between the customer requests and the companies much more than the challenges in reactive services. Overall, the interviewees felt that the management of proactive service deliveries is at a relatively good level in the case companies and the challenges emerge from such unique aspects as the customer base, the service concept or organization structure. The interviews highlighted challenges in customer participation, the importance of locations and environment in service deliveries, and timely spare part deliveries from the sub-contractors. These were the issues that were most important according to interviewees own experience in proactive service deliveries.

The standardization of service processes differs between the case companies. Some processes are well standardized but others vary depending on the customer and the piece of equipment. For example a manager at one of the case companies noted that their wear part service deliveries are well standardized but their field maintenance service deliveries vary a lot and the manager compares them to a car repair. Every piece of equipment requires a bit different maintenance tasks and the processes are different. Some main challenges related to the lack of standardization were expressed as part of the interviews. A manager at one of the case companies noted: *“Because the service processes are not standardized and the services are not productized enough, the pricing and the offering of the services is much more difficult than products.”* Another manager explained that they have had cases where spare parts have delayed and the service delivery has failed. They are now trying to ensure that these kinds of situations will not happen again. Also, the interviews revealed that

certain parts of service processes may be better standardized whereas other parts may still be quite customized.

4.2. Customer participation in service deliveries

Customer's participation in service deliveries was experienced as crucial particularly in case companies A and C, and important also in CompanyB. In CompanyA and CompanyC the most important thing emphasized in the interviews is the information the customers offer. Customers have to give certain information for the companies so that they are able to properly plan and schedule the service deliveries. This information includes for example knowledge of the piece of equipment in question, details of the problem or need and possible information about planned stoppages. A manager noted: *"In my opinion we could give more responsibility to the customer regarding the validity of background information. There could be some kind of automatic procedures because there often are quality errors."* In CompanyB's case the importance of customer participation varies. In some service deliveries the customer participates highly in the service delivery and for example does some maintenance tasks by itself. In other cases the customer may participate only to necessary extent.

In all case companies the customer participation highlights the importance of communication. The means the case companies use to communicate with the customers are both formal and informal. Most important means of communication for the case companies are email and meetings. However, even though in many service deliveries the information is a crucial aspect, the case companies have standardized the communication models only little or not at all. For example, a manager at one of the case companies explained that they have certain information that they ask from the customer every time, but still in many cases there is a lack of information and they have to contact the customer several times. This leads to delays in the service deliveries.

Particularly in one of the case companies the need to promote end-customers' service use through sales intermediaries was highlighted in the interviews, and it deserves further attention as it illustrates the triadic setting in service delivery. The company uses several sales channels and in some cases they are facing challenges to know who the end-customers of their products are. This issue originates from the supply chain management and the fact that the chain is not transparent enough.

The company has tried to promote the end users to inform about the pieces of equipment by offering additional guarantees. However the guarantees have not been successful incentives for the end users. A sales manager noted: "Typically our products are such that if they have a two year guarantee, they break right away or last 15 years. Half a year additional guarantee is not a very big benefit." At the moment the company is developing a software system to ease the registration of the equipment. The end user would just scan the serial number of the piece of equipment with a mobile phone or tablet and the registration would go through the software system.

The company also considered incentives for their distributor partners and integrator customers to inform them who their customers are. In case of distributors the company could develop into repetitive concepts such services that would be easy to sell and they could offer some kind of compensation for the distributors to sell their services with the products. Integrators are more complex case because some of them

compete with the company in the service area. If the integrator is a competitor, they have no means to promote the integrator to inform them of the end-customers.

Also the organization structure of the company has been considered as a relevant issue. Their product and service departments are separate and it hinders their service sales because the cooperation between the departments is not sufficient. According to a manager they do not offer the customers services at the same time as products. This is a sales problem and it could be solved by adding cooperation between the departments. At the moment the company is trying to integrate the departments at some level in order to ease the sales process.

Furthermore, the company example demonstrates increased complexity due to the use of several different information systems and even the different departments' use of different systems. Due to the complexity in such support systems, cooperation between the service and product departments is not always easy. If the sales departments had common systems, it would be easier for them for example to inform the other department of leads.

4.3. Use of remote technology and its requirements on the service deliveries

All the case companies can produce some services for multiple customers at the same time. The technologies in the customer's use and remote technologies to monitor equipment generate unique requirements toward the manufacturer. Interviewees had experienced that both core equipment technologies and remote technologies to monitor them are relevant in service delivery, and the development toward technology-related services is currently ongoing.

The different technologies embedded in the equipment causes requirements for the service deliveries. Interviewees in all the case companies highlighted that the technologies require different competencies and resource management becomes more complex. In all the companies, supervisors in each team or unit are in charge of resource and competence management. Also the technology embedded in the customer's premises can cause requirements for the case companies. A manager explained: *"In some customer premises the maintenance technicians working in there have to have security certificates. This means that all our maintenance men cannot work in all locations."* This adds the complexity of the resource management.

The interviewees in the different companies had somewhat different experiences related to technology and its role in standardization. For example the long lifecycles of the equipment are a central issue when pursuing standardization as there are multiple generations of the same equipment category in use all the time. A manager at one of the case companies explained: *"Some of the customer's pieces of equipment can be several decades old when others are new. Challenges arise when we have to compare substitutive products to these pieces of equipment."* Also the size of the piece of equipment can affect the service deliveries. One manager had experience of spare part deliveries and he noted: *"It is a logistic nightmare to replace thousand parts that weight 400 kilos."* The technology embedded in the equipment can have traditional and surprising effects on the service deliveries and its role has to be remembered when managing a service delivery system. Some of the interviewees emphasized the competences needed for handling technologies in customer's use and

the need for internal knowledge of these competences. To achieve customer satisfaction, it is quite crucial to find the right experts for service delivery when equipment lifecycles are long and generations of equipment differ from each other.

All the case companies showed interest in the interviews for monitoring the equipment and using the gathered data for predicting customers' service needs. A manager at one of the case companies told: *"There are lots of opportunities to exploit the data. -- The idea behind it has to be the willingness to help the customer."* All the case companies gather installed base data from their customers. The most highlighted issue in the case companies at the moment is the management of the data. Different information systems across units cause challenges and in many cases the data has to be added into several systems. At the moment CompanyC has the most developed remote service offering. They are actively gathering remote data and use it in their service production. Their biggest challenge is that in theory remote services are enabled but in practice development in the processes is still ongoing.

5. Discussion

5.1. Standardization of delivery systems in industrial services

The first research question relates to the features that need standardization when developing a manufacturing company's service delivery system. This study reveals that the important features in standardization can be divided into reactive service factors and proactive service factors. The identified reactive service factors include resource management, cost and time management, problem solving and information management regarding service specifications. In reactive services, therefore, standardization appears to require actions on a very operative level in the processes and practices governed by the manufacturing firm. The proactive service factors, in turn, consist of customer participation management, facility management and spare part delivery time management. Therefore, in proactive services, standardization is considered in terms of how the customer interface is managed and how customer requirements are fulfilled in the service delivery. In all, these factors agree with earlier literature relatively well, but point out the necessity to consider standardization at multiple levels: customer interaction, service delivery system, and micro-level operations of the manufacturing firm.

Many of the factors found in this study have been noted in Roth and Menor's (2003) study of service delivery systems. For example resource management, information management in service specifications and customer participation management can be considered as infrastructural design choices. Facility management and spare part delivery time management on the other hand are related to structural design choices. Cost and time management and problem solving have not been covered in Roth and Menor's framework because they can be considered as more specific than the framework. Our findings, thereby, contribute by highlighting some of the micro-level operations that complement the general framework on service delivery systems, particularly in the reactive services of engineering firms.

Some of the factors relevant to service delivery system standardization can be related to the service supply chain models of Ellram et al. (2004) and Baltacioglu et al.

(2007). For example customer participation management has been considered in both of the previous models. Information management regarding service specifications and resource management can be related to Baltacioglu et al.'s model. The other factors have not been covered in the supply chain models because the models are made on a more general level. Therefore, our findings on the industrial services of engineering firms contribute by highlighting the focus on proactive services, when seeking standardization at the customer interface activities.

Both in reactive and proactive services, the results showed unique challenges, depending on the service type, customer, context and other factors. Variation occurred in the service delivery systems, as well as situation-specific service delivery. The findings, therefore, promote the idea that different service delivery systems are needed for different situations even within the same manufacturing firm.

5.2. Customer participation and end-customer information in service production

The second research question inquired the manufacturing firms' means to manage customer participation and end customer information in service delivery. The interviews showed that even in the case of proactive services, customers have an important role in enabling and even driving standardization possibilities. Customer participation and information provided by customers may either advance or challenge the standardization of services. If customers are willing to provide information that suppliers need for service standardization, they can be enablers of the standardization process. However, in the opposite case suppliers may be powerless regarding their standardization objectives.

The results lend support to Safizadeh et al.'s (2003) claim that customer participation increases the variation in the system and causes requirements on many aspects. The study also reveals that in many cases the customer participation is an essential part of the service delivery, thereby agreeing with Zomerdijk and de Vries' (2007) research. However, customer participation was experienced as somewhat more central in the standardization of service delivery than what is proposed in some earlier research. For example Carlborg and Kindström (2014) claim that customer participation has mainly been seen as minor and supplementary. Also Xue and Harker (2002) explain that the customer's cooperative role in service production is often neglected. In this study, engineering firms considered customer information and customer participation as quite relevant in the pursuit for standardization.

In particular, one of the case companies demonstrated a clear triadic setting where the cooperation through sales intermediaries with customers made the access to customer information and participation especially challenging. Such intermediaries have been identified in earlier research particularly in terms of service providers between the equipment manufacturer and customers (Finne & Holmström, 2013). The findings in this study complement earlier research in revealing the importance of the transparency of the service supply chain, organizational structure and partner management in a multiple sales channels situation.

Certain practices were emphasized in the results, in attracting customer participation in service delivery. For example, the incentives for the end-customers have to be significant enough so that they are willing to register their pieces of equipment. The

case company has offered additional guarantees but these have not been significant enough for the end-customers' business. Organizational structure was considered as relevant to the end-customer service promotion. If the service and product sales departments are separate, the communication between the departments is crucial. The literature regarding triadic settings mainly concentrates on the structure of the triad, and this study has revealed practical ways in which the transparency and cooperation in the triad can be enhanced.

5.3. The role of technology in service delivery system standardization

The third research question dealt with the role of both equipment technologies in the customers' use, and remote monitoring solutions as prospective means of service delivery system standardization. According to the results, the low or limited degree of standardization may hinder offering of services and the efficiency of service delivery, which in turn make the pricing and marketing of services complex. Thus, standardization of services can be considered as a necessity for large-scale service provision.

The technology embedded in the equipment causes requirements for the service delivery system. The most important requirement is resource management. According to the results, different technologies require the availability of different competencies. This has been noted also in the previous studies. For example Roth and Menor's (2003) service delivery system framework highlights the importance of resource management. This study was focused on engineering firms with multiple different complex systems, with different generations of equipment in use globally at the customers' locations. This complex setting and its requirements to resource and competence management draw attention to the organizational arrangements in service delivery systems. Further research is needed, to map and analyse with more detail how resource and competence management should be configured, to meet the needs of global engineering firms in their industrial services.

One promising means for service standardization seems to be the use of remote technologies even though it also requires investments into development, as the results show. As the interviewees commonly noted, in particular, in the case of reactive services they are reliant on the information given by the customers. Use of remote technologies would decrease this dependency, and reliable information about the equipment and its malfunctions and repair needs would be readily available for the supplier. Moreover, it would shift the focus more toward the direction of proactive services. Remote technologies would also establish a connection between the supplier and the end-customer even though the supplier would be a peripheral partner due to the intermediary retailer. This way the supplier could promote better the use of services among end-customers.

Even if the remote technology can provide a means to promote standardization of services the diversity of the equipment poses still challenges for this process. Hence, a question remains whether the data obtained from divergent equipment is uniform enough to be useful for service standardization.

6. Conclusions

6.1. Contributions and managerial implications

This paper contributes to the research of service delivery systems by discussing the standardization of delivering repetitive industrial services and promotion of service use in triads; topics only bypassed in the previous research. The topic was approached through a qualitative case study in three manufacturing companies offering industrial services.

Based on the results, two main points regarding the standardization of service delivery systems were highlighted. First, even though the case companies are already experienced in industrial service business and can be considered as unique in their settings, standardization in the service delivery systems was perceived as relevant, necessary and feasible. Standardization possibilities were identified both in reactive and proactive services and on three levels: micro-level operations of the firm, customer interaction and the service delivery system. Second, proceeding in the standardization process is problematic and some aspects require special attention. Differences in standardization practice exist across service types, contexts and organizational structures. In addition, the results showed that wide-ranging technologies and multiple customers set requirements for wide-ranging competencies and resource management. This study contributes to the topic particularly by considering complex settings in which all equipment are unique and multiple customers are serviced in cooperation with various third parties.

This study has featured some factors that need standardization in manufacturing companies, potentially to be taken into account in managerial practice. The importance of customer participation in service production was highlighted and the results can be used to understand the relevance of customers in the service delivery system. Furthermore, technology has various roles as a means to promote service delivery system standardization. This study has explored how equipment technologies drive changes in the service delivery system, and how remote monitoring services can ease the development.

6.2. Limitations and ideas for further research

The main limitation of this study relates to the research design choice of a case study in three manufacturing companies. The results cannot be generalized as such to cover all other manufacturers offering services even though the results were validated in workshops in the case companies. Detailed analysis would require more extensive data collection among a larger group of manufacturing companies offering industrial services.

Further research is needed particularly on: 1) the details of remote technology use in complex and global service contexts; 2) triadic customer cooperation in alternative partner configurations; 3) implications of the lifecycle of equipment technologies on service delivery, and 4) the practice of resource and competence management in industrial services in global engineering firms, particularly when equipment lifecycles are long. As this study was focused on the manufacturers' operations only, it would

be interesting to expand the study to 5) cover also the customers' and third parties' viewpoints, to provide a more comprehensive outlook of the subject.

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C: Innovative services, sustainability and value-creation

C1: Innovative services and innovation determinants

Chair: Jon Sundbo

Determination of Innovation Capability of Organizations: Qualitative Meta Synthesis and Delphi Method

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Abstract:

Characteristics of firms, especially service firms, are defined by rapid change, globalization, hyper innovative competition, etc., and recent research shows that one of the most dynamic capabilities that lead to the strongest competitive advantage in the organizations is the innovation capability. The innovation capability is associated with other organizational capabilities. So, many organizations have focused on the need to identify innovation capabilities and resources or strengths in relation to external opportunities and threats according to inside-out view because innovation capability has consistently been defined as a new service, a new product, a new technology, or a new administrative practice and process. Developing the innovation capability as an important aspect of dynamic capabilities of a firm is an important research project and it can help to achieve competitive advantage in this rapidly changing world.

This research focuses on recognition of the aspects of innovation capability and proposes a conceptual model based on a qualitative Meta-Analysis of academic literature on organisations innovation capability. This is proposed for the development of the concept of innovation capability in the organizations and this paper includes an expert based validation in three rounds of the Delphi method.

This research proposed a direct relationship between Innovation Capability and three main capabilities that is called Structural Capability, Personnel Capability and Operational Capability (S.P.O. Model). Also, it offers the most important indices which directly influence and are related to the Innovation Capability.

Key words: Organizational Capabilities, Dynamic Capabilities, Innovation Capability, Personnel Capability, Structural Capability, Operational Capability.

1. Introduction

To maintain the survival of organizations in the competitive context of the world today, organizations have no way out except attaining a competitive advantage (Porter, 1980; Barney, 1991). In order to explain the competitive advantage in organizations, two viewpoints are to be considered: The first approach which is based on the Industrial Organization Theory (Bain, 1968) in Michael Porter's ideas regards attainment of competitive advantage as resulting from environmental opportunities and is called the Market Based View (MBV). The analytical instruments utilized in this point of view are analysis of the value chain, analysis of competitive forces, generic strategies, competitiveness, clusters, competitive advantage of nations, etc. (Porter, 1980). Another approach the issues of which became common in the strategic management literature since the publication of the article "Resource Based Theory" by Wernerfelt 1984 is called the Resource Based View (RBV). This viewpoint has been investigated and developed by other experts and the related models have been appraised in organizations (Barney, 1986). Numerous studies in the last two decades have indicated that the competitive advantage based on internal capabilities of organization is the best origin for generation of success (Crook et al., 2008). The capabilities approach constitutes an extension to the resource based perspective (Helfat et al., 2007). In this conception, resources change through the action of capabilities approach, while some capabilities may deal specifically with adaptation, learning, and change processes. All capabilities have the potential to accommodate change (Helfat et al., 2003). Capabilities refer to the firm's ability to alter the resource base by creating, integrating, recombining and releasing resources (Eisenhardt & Martin, 2000). Also, many theorists have focused on the need to identify organizational capabilities and resources or strengths in relation to external opportunities and threats according to inside-out view of resource based approach in the firms (Bryson et al., 2007). So, capability translates to dynamic capability for Interaction of internal resources of organization with environmental opportunities (Teece et al., 1997-2009) and the innovation capability is one of most important dynamic capabilities that orientates the organization to adapting with environmental opportunities (Saunila et al, 2014). The innovation capability can be either a new product, a new service, a new technology, or a new administrative practice (Hage, 1999). This approach defines a capability for innovative organization as one that is intelligent and creative, capable of learning effectively and creating new knowledge (Lam, 2004).

An Investigation of scientific articles shows that most articles in the area of capabilities do not usually offer any recommendation concerning the procedures for management of the development of capabilities (Borjesson & Elmquist, 2011). In the innovation literature, researchers have pointed to the lack of a comprehensive theory or model of innovation and the related capabilities with a capacity for organizational understanding (Khalil, 2002).

For this purpose, this research follows to find factors influential on innovation capability of organizations through a procedure with provision of a comprehensive model and the theoretical confirmation of the model.

2. Research Method

This research is descriptive and non-experimental and employs a qualitative research method. Data collection is obtained through the following two ways:

- A. Qualitative Meta Synthesis of literature. The researchers reviewed most of valuable and scientific papers and articles in Innovation Capability field with critical consideration (Maxwell, 2013), so this research made a critical review on all of the articles that focused on innovation capability in the past decade. At last, the conceptual model proposed for the development of innovation capability in the organizations, and thus
- B. Delphi method, for the conceptual confirmation of the conceptual model (Boynton & Zmud, 1984) of innovation capability, an expert panel formed in three rounds (first round interview, 2 rounds of questionnaires). The panel include 20 innovation experts (number Academic Scholars and number Practitioners; which were elected as experts in organisational capabilities due to their research field or their Managerial role in an organisation with innovation as key business e.g. an entrepreneurship organisation; but also their availability).

The qualitative collected data (from both A and B) was coded and classified. Then the questionnaire data analysed by statistical analysis with Arithmetic Mean (Average in Statistics). The statistical measurements come out from five-step Likert questionnaire.

Table 1: Overview of the applied research design

In this research:	
Research Paradigm	Qualitative Research Paradigm
Methodology	Multi method: Meta Study and Delphi
Research Strategy	Qualitative Meta Synthesis and Delphi Panel
Data Collection	Documentations, Literature Review, Past Review, Structured and Semi Structured Interviews, Questionnaire Survey
Data Analysis	Open Coding and Statistical Analysis

As illustrated in table 1; the general research design is a multi-method study. It consists of step one: the generation of a conceptual model of innovation capability through the critical review of other researches by qualitative meta synthesis. In step two, a Delphi panel is set with innovation capabilities experts utilizing the snowball technic. Then, as the first round of Delphi, short structured interviews with individual experts. This was followed up by a second and third rounds of Delphi using a questionnaire. For data analyses of the answers, open coding (for literature review and interviews and statistical analysis (for structured interviews and questionnaire survey). Based on the prior knowledge experts of capability, we proposed a final conceptual model to describe and improve organisations innovation capability. Which consists of dimensions, components and indices.

3. Innovation Capability

Innovation capability consists of internal reinforcement procedures and processes. This process is a key mechanism for stimulation, measurement, and reinforcement of innovation (Lawson & Samson, 2001). Many authors consider innovative capabilities equal with being innovative or even innovative performance of aspects that could be quantitatively assessed (e.g. the number of inventions registered or the number of operations of a new product). Although these measures are useful pieces of information on the performance of the firm, they do not offer a picture of innovation capability of the firm. The concept of capability is not a performance parameter but it is an index of preparedness of the firm and the development through innovation forces (Borjesson & Elmquist, 2011). This research believes innovation capability is a great ability to provide innovative services and products continuously through the organizational capabilities, capacities and competencies. This definition is utilized by some other researches (Saunila et al., 2014; Saunila & Ukko, 2012; Sáenz et al., 2009; Lawson & Samson, 2001).

With reference to the summarized literature and the research paradigm of this study which is formulated on the systematic definitions of innovation, it is understood that innovation capability is dependent upon other capabilities in the organization which may be classified into three groups of Structural Capability, Personnel Capability and Operational Capability (S.P.O. model) as the main dimensions. The operational capability is very much dependent upon technological capacity and support capacity, and the personnel capability is dependent upon the individual knowledge capacity, finding of business environmental opportunity and idea generation ability which is based on creativity of human resources, and the structural capability is dependent on internal processes of organizations as managerial capacity, cultural capacity, communicative capacity and organizational knowledge capacity.

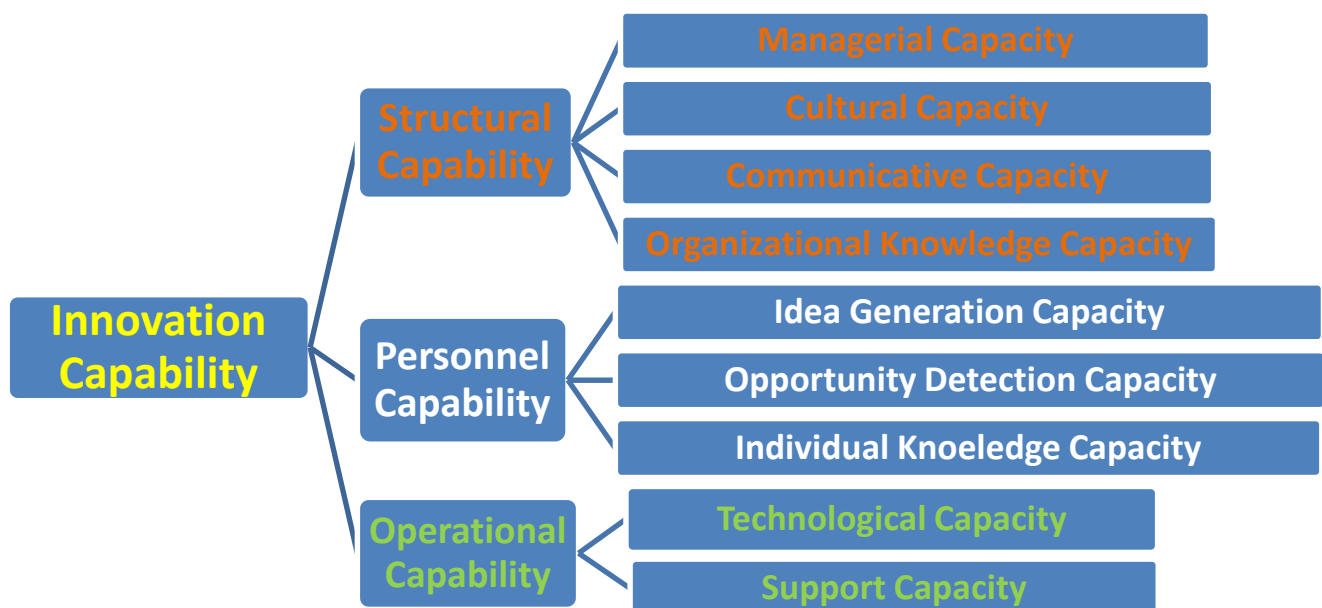


Figure 1: The S.P.O. Model of Innovation Capability (Structural Capability, Personnel Capability and Operational Capability).

3.1. Dimensions of Innovation Capability

Innovation is a complex technological, social, and economic process. Therefore, success is not measured through just one or two factors and no factor could be effective alone. As such, no management or technical tool or instrument can establish an efficient environment for innovation. In fact, what we obtain in research is a collection of different factors which should regularly establish and improve an innovation environment so as to guarantee the innovation success in an organization (Barnano, 2005). Innovation capacity completes as the result of several relationships and communication among organizational, resources, qualifications, and connections with other organizations (Hii & Neely, 2000).

Therefore, the innovation capability of a firm is not the result of one of its abilities but it flows from a collection of abilities and other capabilities, which means an internal potential for generation of new ideas, identification of new market opportunities, new services and products through resources and capabilities of a firm. Considering the literature reviews, this research believes innovation capability has been dependent on other capabilities in an organization and classifies them into three groups including: structural capability, personnel capability and operational capability.

3.1.1. Structural Capability

Structural capability is effective in the provision of organizational innovation capability since organizations should take the most advantage of their internal organizational situation and structures for development of new capabilities and reconstruction of the existing capabilities (Colarelli O'Connor & DeMartino, 2006). Structural capability states that in addition to operational dimension, the structural changes of an organization toward the establishment of a capability that causes the flow of the innovation capability in the organization plays a significant role for achieving success. Some define this as the capability for the formation of a stable structural mechanism for modification of all activities toward common goals for the purpose of an effect on the speed of innovation process through infrastructure for developmental projects (Guan & Ma, 2003) and some others refer to it as a structural mechanism of an organization for realization of innovation (Lichtenthaler & Lichtenthaler, 2009).

Of course, this research is of the opinion that structural capability is dependent upon four capacities in an organization: managerial capacity, cultural capacity, communicational capacity and organizational knowledge-based capacity which is based on the storage and generation of organizational knowledge and organizational learning.

With the emergence of large companies in the early twentieth century, many attractions have come up around the role and functions of managers (Chiesa et al., 1996). The issue has been dealt with in different scientific areas such as operation theory utilizing scientific knowledge on production systems, vertical and horizontal assimilation of provisional chains. They claim that the management of firms are able to carefully plan and coordinate

resources and capabilities of an organization (Zawislak et al., 2012). Structural changes of an organization toward establishing capabilities for the purpose of developing competitive superiority is understood only through managerial capacity (Zawislak et al., 2013). The innovation capability relates directly with managerial capacities such as planning an appropriate organizational structure, planning a mechanism for relationship with mainstream of an organization, multilevel management and a proper decision-making mechanism, use of innovation networks, budget and reward system based on innovation, strategic planning, and leadership style (Colarelli O'Connor, 2008). Also, studies show that there will be no improvement in the development of capabilities without an explicit and coordinated support by managers regarding the origin and outcome of capabilities (Borjesson & Elmquist, 2011). Certainly, Innovation increases the competitive advantage of firms, but for this purpose, a procedure is required for the management of new knowledge and skills which are applied for the daily management of firms (Tidd et al., 2005).

On the other hand, the management system which applies the innovation capability as a strategic capability for activating the cycle of innovation strategy and couples the existing trade with the strategic innovation system can achieve more success in the innovation capability (Kodama & Shibata, 2014). Also, it is necessary to emphasize that integration and coordination among other capacities for the establishment or development of organizational innovation capability is carried out by the management of an organization (Lichtenthaler & Lichtenthaler, 2009), this is combined in this study under the title of managerial capacity.

One of the other most important components of innovation capability is the knowledge of organization which are accumulate in personnel and information systems of organizations and firms (Skiltere & Jesilevska, 2013). Organizational knowledge refers to accumulated skills and expertise (Hefat et al., 2007) but many authors and theoreticians distinguish between exploration and creation of knowledge on the one hand, and exploitation of knowledge on the other (Bansal & Bonger, 2007). Moreover, some believe that organization of knowledge processes takes place beyond the boundaries of firms (Cassiman & Veugelers, 2006) and, of course, some authors have laid stress on the significant role of the combination of internal and external knowledge in the process of innovation. It is necessary to emphasize that restoration of the internal knowledge refers to generation of new knowledge within the firm and restoration of the external knowledge refers to the description of the acquisition of knowledge from outside sources (Lane et al., 2006). Exploitation of the internal knowledge is the description of the internal innovation and exploitation of the external knowledge refers to the transfer of knowledge to outside of the organization (Lichtenthaler, 2007).

Also, exploitation of knowledge involves repetition of new methods in different situations and implementation of the internal and external programs in various circumstances since organizations are different by nature and for survival in environmental changes make different choices for utilization of their innovations. And it is to be emphasized that maintenance of internal and external knowledge is related to organizational processes and guarantees the constant transfer of knowledge through which the best start for exploration, maintenance, and exploitation of knowledge takes place (Zollo & Winter, 2002).

For the purpose of the development of the concept of the capacity of organizational knowledge that refers to re-creation of dynamic capabilities, it is emphasized that dynamic capabilities provide for the capacity of an organization for the establishment, development, and change of its resources (Helfat et al., 2007). In accordance with this approach, firms

should dynamically embark on development of capacities for knowledge to benefit from the innovation (Chesborough, 2006).

Also, in the maintenance of knowledge, an organization confronts the issue of integration or dependence of knowledge which is a reference to the likelihood of the combination of internal and external knowledge. Of course, the complementary nature of internal and external processes of knowledge requires coordination in the organization (Cassiman & Veugelers, 2006). An organization needs reconstruction in its knowledge for boosting conformation ability or modifying environmental conditions earlier than competitors in order to be successful (Lichtenthaler & Lichtenthaler, 2009).

Absorption and maintenance of external knowledge for transfer to the organization should be considered seriously. Of course, for the purpose of gaining and having access to external knowledge, a firm should often provide for the transfer of a part of its knowledge to outside (Grant & Baden-Fuller, 2004).

In fact, the organizational knowledge capacity contributes to the revision of the source of innovation with the goal of surviving over time since the necessity for transfer and renewability of resources is considered a significant principle in dynamic capabilities (Lichtenthaler & Muethel, 2012) and also because organizations should activity renew and rearrange their innovative processes over time (Helfat et al., 2007).

Cultural capacity is represented by the organizations which have structured flexibility into their organizational culture to embed and encourages teamwork, creativity, learning and collaboration which creates value collectively (Verma et al., 2014). Cultural capacity is the culture executed by a learning organization with the aim of creating a culture to contribute to a valued outcome by enhancing organization's ability and thereby boosting innovation capability (Hung et al., 2010). Emphasizing cultural facets which impart comprise management backing for inspiring employees to work together, search, interact, and seek support toward innovation will lead to acquisition of capacity resulting in innovation (Verma et al., 2014).

Innovative activity may arise from any part of the organization process such as organizational communication abilities, entrepreneurial ability, adaptability, etc. Also communicative capacity contributes strongly to innovation, especially in services and in organisational innovation. A communication channel is a structural characteristic that can be used by a decision unit to achieve successful innovation implementation within organizations (Fidler & Johnson, 1984). The communicative capacity refers to organizational ability for networking and cooperating with other organizations (De Marchi, 2010).

3.1.2. Personnel Capability

This research believes that personnel capability is dependent upon three capacities in an organization: capacity for finding opportunities, capacity for generating ideas and capacity for individual knowledge which are based on the creativity and other abilities of human resources.

Finding and exploiting environmental opportunities has always been a big challenge for the organizations in confrontation with the dynamic environment (Lichtenthaler, 2007). Therefore organizations and firms need to develop new and special abilities and capacities

for exploitation of new environmental opportunities (Phillipset et al., 2005). This is because the firms which show more potential for exploitation of new ideas are said to possess more innovation capability compared with competitors (Francis & Bessant, 2005). So, the first step in the innovation process is finding, considering and establishing innovation opportunities for the organization (Lichtenthaler & Ernst, 2012). Also the dynamic capabilities approach has paid particular attention to exploration of new opportunities as a dynamic principle in capabilities and has described it under the title of sensing capacity (Lichtenthaler & Muethel, 2012). As a result and with precedence, innovation capability, which is the core capability concerning dynamicity, requires finding new ideas in the midst of opportunities. Thus, it can be stated that even more important than technical capacities, provision of applicable innovative pathways is the centroid of the innovation capability of any organization (Zawislak et al., 2012).

On the other hand, formulation of new ideas can be presented in the framework of a model, concept or program. New ideas can be a new service, a new product, a new technology, or a new technique for the management of staff (Soltani Tirani, 2008). Of course, exploration and generation of ideas include two major phases: A) Thinking of ideas as possible clues, and B) Selection of ideas, addition of other ideas, and re-implementation through change and combination of ideas (Sborn, 1992). Moreover, innovation capability is an internal stimulating energy for production and exploration of new ideas in utilization and examination of solutions for the detected environmental opportunity in the atmosphere of market, and it is argued that one way to develop this capability is to increase the absorption capacity of firms for these opportunities (Assink, 2006). Of course, for the purpose of idea generation activities, it is not enough to be creative; the whole process of survey, development, integration and implementation should be considered (Borjesson & Elmquist, 2011). Thus, the seizing capacity referred to in dynamic capabilities which attempts to create source values for the organization, assumes the role and responsibility for idea generation and conceptualization concerning availability in the process of innovation capability in an organization (Lichtenthaler & Muethel, 2012).

Also, should emphasise that the idea detection and generation capacity directly refer to personnel and staff abilities (Saunila et al., 2014; Raffai, 2014).

On the other hand, it is to be emphasized that the innovation capability refers to the ability of a firm to innovate through internal knowledge that is it indicates generation of knowledge within the personnel and staffs. This process of knowledge exploration starts with the understanding of particular opportunities by the ingenuity of expert personnel, and after the generation of the new knowledge, they have to maintain a relationship between this new knowledge and the environment opportunity (Shane, 2000). Of course, the process of knowledge generation usually requires time since an invention is more than a mere idea and the generation of new knowledge generally occurs in response to a need (Khilji et al., 2006).

For the purpose of recognition of environmental opportunities, personnel knowledge should be reactivated and assimilated with the new knowledge. Moreover, it should be internalized again through experience. Knowledge can be traded and changed since new knowledge over time so that they could employ and activate it later again (Pandza & Holt, 2007).

3.1.3. Operational Capability

The operational capability of an organization, which focuses on technological and operational activities and abilities of an organization, contributes to the achievement of organizational goals and is under the direct influence of a techno-loop. This is formulated in this study in the frame of operational capability in accordance with the researches carried out by other researchers as technological innovation concept (Figueiredo, 2002; Acur et al., 2010; Zawislak et al., 2012).

Among a collection of abilities which all firms utilize for the generation of various innovated products and services, technological capacity have achieved a prominent position in different studies. The concept of technological capacity of a firm is defined as the ability of a firm in the use of technology and combination and recombination of parts and constituents, and the relationship among constituents, procedures, processes and techniques (Afuah, 2002). Therefore, the development of technological capacity requires investment of time and resources to establish a structure for the development and maintenance of this capacity (Ho et al., 2011).

Among various capabilities of a firm, the technological capability is necessary to a greater degree. This is because it makes it possible for the firm to establish new concepts, processes, and solutions. For this reason, firms with innovative capabilities are more likely to increase their profit compared with the competitors (Patel & Pavitt, 1997).

With reference to the present features of competitive environments, while the level of competition is on the increase in the industry, the technological capability has increasingly been seen as a vital factor for the maintenance of long-term competitive advantage for firms (Acur et al., 2010).

Technological capacity of a firm is the result of learning processes (Jonker et al., 2006) which require ample use of knowledge and mobilization of scientific and technological resources so as to make the generation of the innovative products and services possible (Garcia et al., 2007). Therefore, the firms that have developed their technological capacity boost their chance of success compared with those who have less-developed technological capacity. It goes without saying that increase of this capability does not happen by chance but absorption, concordance, and change of the existing technology is necessary for the development of technological capability (Madanmohan et al., 2004).

Studies show that four basic aspects are inherent in the technological capability: A) Learning processes, B) Strategic focus on technology, C) Difficulties of abilities' transfer, and D) ability of Dynamics (Figueiredo, 2002).

In other words, the firm should be able to change its abilities, skills, and technological know-how. When this happens, it may be claimed that has technological capacity (Tello & Zawislak, 2013).

In addition, it may be stated that operational capability is also dependent on the transactional abilities of an organization. Achievement of competitive superiority through sales is facilitated by what is called transactional ability. Transactional ability is, in fact, all the activities that a firm performs to reduce marketing, bargaining, and delivery costs. In other words, reduction of transaction costs becomes possible through transactional ability. Of course, the role of transactional ability in the establishment of innovation capability for the firm is justified on the condition that when the firm can produce a product or a service with innovative superiority compared with similar goods and services on the market, it should be able to bargain it on the market. And because all firms permit the use,

management, and processing of their technology for the explicit and clear goal of positive economic income, they should have a certain abilities for trading their products and services (Zawislak et al., 2012).

Transactional ability should act in a way that this innovative technology does not transfer to competitors to make sure that it results in the maintenance of competitive advantage for the firm (Barney, 1991) and also the firm can absorb technological innovations in the industry. Of course, like all capabilities, capacities and abilities, transactional ability should be established, developed, and changed. In this process again learning plays a key role (Mayer & Argres, 2004). In fact, development of transactional ability will contribute to the development of innovation capability (Zawislak et al., 2012).

Also, the supportive capacity of an organization such as logistical and supportive process and the work place situation of an organization do an important role for developing of operational capability in order to innovation capability (Mello et al., 2008; Shan & Jolly, 2010; Zawislak et al., 2012).

3.2. Index

All the theoretical concepts should be segmented into dimensions to understand their various aspects. And on the next level, dimensions should be broken down to components. Also, for certain empirical aspects of a subject, components should disintegrate to indices (Bhattacharjee, 2012).

In this research innovation capability is the core concept of research, so the personnel capability, structural capability and operational capability are the main dimensions. Also, the main components and indices are listed in Table 2.

Table 2: Indices of Innovation Capability

Concept	Dimension	Component	Index
Innovation Capability	Personnel Capability	Opportunity Detection Capacity	Business Environmental Survey
			Accuracy, Attention, Intelligence
		Idea Generation Capacity	Creativity
			Practicality
		Individual Knowledge Capacity	Knowledge
			Experience
	Structural Capability	Managerial Capacity	Strategy And Goals
			Management Style

			Stability of Management
			Resource Availability
		Cultural Capacity	Flexibility
			Diversity
			Risk Acceptance
		Communicative Capacity	Networking
			Cooperation
		Organizational Knowledge Capacity	Organizational Learning
			Knowledge Storage
			Knowledge Absorption
			Information system
	Operational Capability	Technological Capacity	Research & Development
			New Technology
		Support Capacity	Logistics
			Work Place

4. Results and Discussion

This research focuses on the main factors of Innovation Capability in organizations, which could be seen as new services, new products, new processes, etc.

The outcome of the Qualitative Meta Synthesis of literature, is a first version of the conceptual model; which was modified due to expert's comments in the first two rounds of the Delphi method. The first round was done by structured interviews, and we identified the dimensions and components as figure 1. Then at the second and third rounds, they confirmed components and indices as table 3 and table 4.

It should be emphasised that the agreement within the expert panel is significant. The scientific domination was as minimum 84% that was measured by some questions. It means that the data provided through the panel is very reliable for further studies and other researches and empirical applications. In addition, the participation of panel members has been rated as 90%, 85%, and 85% in the first, second and third rounds respectively.

The statistical measurements come out from Likert (5 steps) by the structured questionnaire in the first and second rounds. Also, the measurements are done for the components and dimensions through the "accept" or "not accept" (2 steps) questionnaire in the third round. Also, the measurements for indices are carried out through the five-step Likert questionnaire.

Table 3: Delphi Results, Dimensions and Components

Does Innovation Capability depend on:		Round 1	Round 2	Round 3	Result	Source
Dimensions	Personnel Capability	-	4.3	Yes	Approved	Interview
	Structural Capability	4.7	4.2	Yes	Approved	Literature
	Operational Capability	3.9	4.1	Yes	Approved	Literature
Components	Opportunity Detection Capacity	4.7	4.2	Yes	Approved	Literature
	Idea Generation Capacity	4.7	4.4	Yes	Approved	Literature
	Knowledge Based Capacity	4.5	-	-	-	Came from literature, but has been broken down to Individual Knowledge Capacity and Organizational Knowledge Capacity due to the expert's comments
	Individual Knowledge Capacity	-	4.4	Yes	Approved	
	Organizational Knowledge Capacity	-	4.7	Yes	Approved	
	Managerial Capacity	4.7	4.6	Yes	Approved	Literature
	Cultural Capacity	-	4.5	Yes	Approved	Interview
	Communicative Capacity	-	4.7	Yes	Approved	Interview
	Operational Capacity	3.8	-	-	-	Came from literature, but changed to support capacity by the expert's comments
	Support Capacity	-	4.4	Yes	Approved	
	Technological Capacity	4	4.5	Yes	Approved	Literature
	Transactional Capacity	2.8	-	-	Refused	Literature

Table 4: Delphi Results, Indices

Component	Index	Delphi	Result
Opportunity Detection Capacity	Business Environmental Survey	4.2	Approved
	Accuracy, Attention, Intelligence	4.6	Approved
Idea Generation Capacity	Creativity	4.8	Approved
	Practicality	4	Approved
Individual Knowledge Capacity	Knowledge	4.5	Approved
	Experience	4.4	Approved
Managerial Capacity	Strategy And Goals	4.6	Approved
	Management Style	4.4	Approved
	Stability of Management	4.1	Approved
	Resource Availability	4.2	Approved
Cultural Capacity	Flexibility	4.4	Approved
	Diversity	4.1	Approved
	Risk Acceptance	4.4	Approved
Communicative Capacity	Communication Network	4.7	Approved
	Cooperation with others	4.3	Approved
Organizational Knowledge Capacity	Organizational Learning	4.7	Approved
	Knowledge Storage	4.3	Approved
	Knowledge Absorption	4.6	Approved
	Information system	4.2	Approved
Technological Capacity	Research & Development	4.5	Approved
	New Technology	4.2	Approved
Support Capacity	Logistics	3.8	Approved
	Work Place	4	Approved

5. Conclusion

Recent research shows that one of the most dynamic capabilities that lead to strongest competitive advantage in the organizations is innovation capability. The innovation capability is connected with to other organizational capabilities. The innovation capability is defined as a great ability to provide innovative services and products continuously through the organizational capabilities and capacities.

This research focuses on the recognition of the facets of innovation capability and proposes a comprehensive model of Innovation Capability in three main capabilities that is called Structural Capability, Personnel Capability and Operational Capability (The S.P.O. Model).

There are found to be nine components under these three dimensions; Structural Capability is dependent on Managerial Capacity, Cultural Capacity, Communicative Capacity and Organizational Knowledge Capacity. Personnel Capability is recognized as Opportunity Detection Capacity, Idea Generation Capacity and Individual Knowledge Capacity. And the Operational Capability is through determined Technological Capacity and Support Capacity. In addition, this research identifies 23 indices as the most important elements which directly influence and are related to Innovation Capability.

This research aim at developing the innovation capability as a significant aspect of dynamic capabilities of an organisation. Organizations and companies can apply the suggested conceptual model to review their organisational innovation capability and to continuously improve their internal resources.

The generic character of this study calls for further research in this research topic and in specific empirical domains. This research could investigate the practical implementation of the SPO model and generate more specific recommends of how to apply this model in organizations and firms.

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Service concepts from future - weak signals from different branches

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In order for facilities management (FM) to proactively support organisations and distinguish their service requirements a deep understanding of future is needed. This paper introduces five branch-specific (retail, senior housing, industry, wellness and well-being, and knowledge work) scenarios in order to predict future challenges for FM. The results suggest that FM should consider: (1) FM in virtual worlds; (2) responsibility, wellbeing and sustainability factors as business drivers; (3) new ways of conducting daily activities, which require new ways of supporting clients; and (4) mixed and multi-use space segments in order to act proactively. These findings might be useful for FM service providers in Nordics and globally.

1. Background

Facilities management (FM) aims to support the core business of an organization in a rapidly changing operating environment. FM should be perceived as a set of strategic proactive actions that support the future of the organization instead of a set of reactive technical and operational services. Deep understanding of the changes in the core businesses of clients in the future is essential in order to understand the future service requirements.

The megatrends in demographic changes, ICT-development and well-being are affecting rehabilitation by changing the customers, products, processes and places for the future. The services provided by FM need to shift from facilities-centric to client-centric throughout (Hinks, 2002) in order to meet ever-changing requirements of businesses. The current socio-demographic changes are creating an enlarging customer group of elderly people. The rapid development of information and communication technologies (ICT) runs parallel to these societal changes and offers possibilities to cope with the above-mentioned challenges.

These megatrends affect resources directly related to FM services in organisations – management of people, business, property and knowledge (Nutt, 2000). People and human resources (HR) are facing the most radical changes, among others, new ways of working, organisational changes, and IT development. Flexible work environments that allow working independent of time, place, and location, require strategic approaches to HR as well as better management of the supporting facilities. Physical resources are the least changing because of slow nature of changes in built environment.

One of the biggest challenges for the future is managing the existing properties by i.e. improving utilization, disposing and facilitating alternative mixture of tenancies (Nutt, 2000). Facilities businesses tend to perceive designs as standardized for single purposes – be it re-

tail, senior housing, industry, wellness, wellbeing or knowledge work, every branch has its own standards and rules of the game. However, due to digitalization, barriers between the branches blur in terms of facilities, as the activities taken in physical environments become increasingly varied.

In order to understand how these changes will affect FM industry, a systematic and more innovative approach to real estate must be taken. Traditionally, real estate research was empirical and retrospective and many times physical properties were considered separately from wider economic, social, environmental and cultural aspects which many times led to oversight of significant connections thus ineffective strategy development (Saurin; Ratcliffe 2011). Latest research (i.e. Jensen et al., 2014, Ratcliffe, 2002, Saurin; Ratcliffe, 2011) suggests that futures studies can provide opportunity for FM professionals to explore the future in a more structural way and strategically prepare for changes by positioning different expected developments through scenario creation (Jensen, 2014). Futures thinking is different from long-term planning in a way that it recognizes that the future is not an extension of the past, there might be different possible scenarios due to a various relationship between factors and it is led by innovation (Saurin; Ratcliffe, 2011).

This paper introduces five facility branch-specific scenarios in order to predict future challenges for facilities management. The branches in question are retail, senior housing, industry, wellness and well-being and knowledge work. The scenarios have been constructed based on research projects which investigated the futures of a variety of space segments that are relevant to the selected branches. Facilities under investigation are shopping centres, residential buildings, offices, wellness centres and industrial production facilities.

2. Trends affecting the FM industry

To understand the development of FM as an industry in more detail, this section explores the megatrends that affect FM the most. It combines industry and academic aspects in an attempt to find interlinkages between the forecasts of ISS (2014), Bev Nutt (2000) and John Hinks (2002).

Hinks (2002) states that IT development combined with the management of knowledge has a huge impact to organisations' core operations, their supply chains, business support and their customers. IT development and virtualisation of operations affects the location of workforce, their usage of facilities as well as the management of knowledge in organisations. Organisations and FM service providers need to acknowledge the interdependency between core business processes and the business support role. Dispersed locations mean that the support functions that previously were provided in one building now have to be duplicated for each individual or delivered at a distance. It brings flexibility to organisations, hence, improving their competitiveness although it might not be economically efficient. Global sources of expertise and increasing need of collaboration and communication leads FM towards a broader resource management role and change from facilities-centric business to a communications-centric virtual business. Successful linking of the right knowledge with the right people at the right time becomes a challenge that FM industry needs to deal with.

Nutt discusses ideas presented in the conference "Futures in Property and Facility Management II" (2004) which again points out the belief that FM services can no longer be consid-

ered as secondary functions but need to take an active and central role by connecting FM, IT and HR together to support people who are driven by a “work is where you are” culture.

The megatrends that will have an effect on FM industry in the upcoming 20 years were identified by Hamish (Nutt, 2004) and they included demographical changes, technological development, social attitudes, ethical pressures and regulations. Ten years later, ISS forecasted nine largest megatrends that will affect the FM industry the most and they were highly corresponding with the previous forecast: economic growth, globalization, demographic trends, and sustainability, technological development, growth of knowledge society, individualization, focus on health and wellbeing and commercialization (ISS, 2014). The main points of the megatrends are summarized in Table 1.

Table 1: Summary of megatrends and their implications to FM industry

Megatrend	Implications to FM industry
Economic growth	Shift towards emerging markets (ISS)
Globalization	Localization (ISS, Nutt); Duplicated, virtual services (Hinks)
Demographic trends	Variety of global workforce needs (ISS, Nutt)
Sustainability or ethical pressures	Supply and value chain, systemic design (ISS, Nutt)
Technological development	Automation and intelligent ways of working (ISS, Nutt); Big data in built environment (ISS)
Growth of knowledge society	Communications-centric virtual business (Hinks)
Individualization	Tailor-made solutions (ISS)
Change in social attitudes and focus on health and wellbeing	Promoting active, healthy and productive lifestyles (ISS, Nutt)
Commercialization	Agile specialization, differentiation and innovation (ISS)
Regulation	Building use strategies, versatility, re-differentiation, flexible tenures (ISS)

These megatrends influence changes in all FM functions: management of finance, HR, properties, and knowledge. Due to properties’ inertia to change (according to Nutt (2000), only 4% of national building stock changes each year), built environment is the most predictable segment of FM industry and can be used as a basis for exploring future scenarios for FM industry in five branches where facilities are in diverse use.

3. Methods and sample

In order to explore the empirical field of FM, five research projects were conducted during 2006-2014. The data consists of a set of five clusters of future scenarios collected during five research projects around usability and productivity of built environment in Aalto University. These projects are shortly described in Table 2.

Table 2: Five research projects analysing FM service future scenarios

Project name	Project focus	More information and reports
Induspace	Usability of Industrial places	http://www.ttl.fi/fi/tutkimus/hankkeet/induspace/Sivut/default.aspx
Prowork	Productivity of Knowledge workplace	www.proworkproject.com
USAB	Usability of Shopping centres	Ainoa, J., Alho, J., Nenonen, S. & Nissinen, K. (2009), Käytettävä kauppakeskus, Teknillisen korkeakoulun rakentamistalouden laboratorion selvityksiä B15.
KUNTO	Usability of Rehabilitation centres	http://www.ttl.fi/fi/verkkokirjat/Documents/KUNTO_loppuraportti.pdf Suvi Nenonen, Heidi Rasila, Veera Romppainen (2012), Wellness and Well-being in the Future – Scenarios for Well-being Centres. http://conferences.chalmers.se/index.php/ARCH/arch12/paper/view/429
SELMA	Senior housing	No published work

All five projects had two common aims. First, each aimed to develop tools and methods to assess the usability of the built environment in different use-specific space segments. Second, each aimed to develop future scenarios in order to understand the role of the spaces and FM in the future. The scenarios were created according to the space type in project focus as follows: Industrial places, Knowledge workplaces, Shopping centres, Rehabilitation centres, and Senior housing.

Futures approach is a structural way for different actors to proactively prepare for possible future pathways (Jensen, 2014) and deal with uncertainty (Saurin et al, 2008). Futures approach is trans-disciplinary in nature (Saurin, Ratcliffe, 2011) and considers interactions between technological, social, economic, political and cultural variables and focuses on information and knowledge flow instead of money and goods (Jensen, 2014).

Scenario development allows to learn about the future by understanding the nature and impact of the most uncertain and important driving forces affecting our world. It is a group process that encourages knowledge exchange and development of a deeper mutual under-

standing of central issues important to the future of business. The goal is to craft a number of diverging stories by extrapolating uncertain and heavily influencing driving forces. The stories together with the work process have a dual purpose of increasing the knowledge of the business environment and widen both the receiver's and participant's perception of possible future events (Schoemaker, 1995).

The development of scenarios is based on Future workshops which consist of different methods which structure the imagination of participants (Jungk and Müllert, 1987) such as: Future Wheel, ACTVOD, PESTE, and Delphi survey.

In the project of *Usability of Rehabilitation centres in Finland*, the future workshop aimed to investigate the future by creating an understanding of the nature and impact of the most uncertain and important driving forces affecting the physical wellness centres. In *Prowork* project, three sets of workshops were conducted in order to understand the change of work and physical and virtual workplaces.

Future wheel was used in workshops of *Usability of Rehabilitation centres* and *Senior housing*. The participants worked with the Future wheel in order to capture the past, present and future phenomena in connection with the rehabilitation/senior housing. Future wheel is a structured brainstorming method used to organize thinking about future events, issues, trends, and strategy and visualising interrelationships between variables (Jackson, 2013).

Additionally, the Futures table exercise was conducted based on differing systematics, e.g. questions like to whom, what, how, where, what are the enablers, what are the hindrances and so called ACTVOD table was used. The acronym comes from first letters of the six variables: Actors, Customers, Transformation process, Values, Obstacles, and Drivers. This is a tool that allows creating network operating models for structuring and development and is based on CATWOD methodology (Hietanen, 2009). The futures table was used in the *USAB (Usability of the shopping centres)* and *Induspace* projects.

Induspace project also included PESTE (otherwise known as STEEP) analysis which consists of five aspects: P for Political, E for Economic, S for Social, T for Technological, and E for Environmental. It gives a bird's eye view of the whole environment from many different angles that one wants to check and keep a track of while contemplating on a certain idea/plan (Laihonen, 2005).

The Delphi study was performed in the project of *Usability of Rehabilitation centres in Finland*. It included two rounds of surveys which aimed to clarify the well-being services of the future. The Delphi survey was structured according to four themes: 1. Rehabilitation of working life in the future, 2. Rehabilitation of the ageing people in the future, 3. Rehabilitation for self-paying customers in the future and 4. The facilities of the rehabilitation and wellbeing services in the future (Rasila et al., 2013). The Delphi method is usually used for producing different views, ideas and justifications on which one can base planning and decision making. The method is relevant when the object of research and the problem are open. With help of the Delphi technique, one can start contemplating and choosing between the future alternatives (Pill, 1971; Jackson, 2013).

Table 3 summarises the methods used in different projects. It also includes information about the participants of the workshops.

Table 3: Methods used in Future workshops and participants in five projects

	Industrial places	Knowledge workplace	Shopping centres	Rehabilitation centres	Senior housing
Future wheel				x	x
ACTVOD	x		x		
PESTE	x				
Delphi survey				x	
Participants	Users (employees) Facility managers, Architects, Researchers N=15	Users (globally), ICT managers, Human resource managers, Facility managers, researchers N=20	Users (different age groups) Experts, Shopping centre managers, Researchers N=40	Users (visitors, different age groups), Experts (e.g. healthcare experts, representatives of different association), researchers N=70	Users (habitants of senior houses) , Facility managers, architects, researchers N=15

In each project, the participants were selected based on their role – the aim was to take different perspectives into account. Participants can be divided to five core roles: users, experts, facility managers, architects and researchers. The main priority was to have users involved in each workshop. Experts were engaged to get insights on the knowledge from the field from past to the future. Facility managers were invited to represent the supply side of the services. Researchers were facilitating the workshops and summarizing the reports. All scenarios despite the Senior housing scenario are published.

The last phase of the Future workshops included the future narratives which summarized the outcomes of the results produced by different methods (Table 4). Each analysed branch had four scenarios drawn except the *Industrial Places* which had five scenarios in total.

Table 4: Future scenarios developed for five different branches

Scenarios	Description
1. Industrial places	
1.1. Monumental industrial space	The old industrial piece of architecture has been taken into new use or the new industrial building is retrofitted to a monumental wow-architecture object.
1.2. Modular container factory	The number of modules can be adapted based on production volume.
1.3. Multiuse pro-	Loft is used as a factory for production only for certain phase of time and

duction loft	can be transformed to other uses easily
1.4. Mobile virtual production space	Fully automatized and controlled from a remote white-collar control centre mobile virtual production space
1.5. Mountain top production space	Space which is based on consideration of all the issues connected to sustainability, energy-use and environmental care.
2. Knowledge workplaces	
2.1. Safety box	<p>It is based on a decreasing role of physical place.</p> <p>Environment is highly polluted and the mankind has not succeeded in decreasing the carbon footprint. Virtual world is the most functional reality and social connections take place mainly in the second and third life. Physical space exists only to protect people.</p>
2.2. First life	<p>It is based on a decreasing role of virtual place.</p> <p>Physical spaces are in full use. Ecocatastrophe has taken place in digital reality and the information and communication infrastructure did not overcome the climate changes. Real estate platforms for living and working and different generations struggle to relearn old ways of working. There are lots of trainings for writing letters and new kinds of time management trainings are famous. Social places are important in order to transfer old ways of working to younger generations who have never seen mobile phones.</p>
2.3. Care and love	<p>It is based on an increasing need of social place.</p> <p>Knowledge intensive society has caused a variety of symptoms for knowledge workers and they gather to workplaces in order to be re-treated. The driving force for working is sharing the work to achieve the goals. Individual performance is rewarded only as part of a collective outcome. Physical and virtual places are designed to enforce a variety of social activities and to provide all possible support for well-being of knowledge workers.</p>
2.4. Network no-mad	<p>It is based on a decreasing role of organizations as infrastructure.</p> <p>Working takes place in networks and individuals manage themselves. Physical places are providing platforms for different networking activities, while virtual place is an office base for individual entrepreneurs. Social places occur in both realities.</p>
3. Shopping Centres	
3.1. Wellness circus with user zip	User profile is in zip and the user is identified by smart and responsive environment in shopping centres. After arriving to a shopping centre, instructions for the recommended user journey is made for the customer – the proposal is based on the status of wellbeing of the individual and the services are tailored according to the profile.
3.2. Virtual interface in the living	No one visits shopping centres but shopping is an individual or social amusement through simulations and haptic experiences in ubiquitous

room	world.
3.3. Community	Community is developed around a shopping centre – shopping centre is a new form of old village with all the services in the near distance.
3.4. Tradition centre	A place to go when disappeared tradition of going to shop needs to be experienced. It is a nostalgic environment, where one can try how it feels to push shopping trolley or to encounter a real shop keeper.
4. Rehabilitation centres	
4.1. Experience centre	The experience centre for sustainable well-being. The centre provides experiences with all spices provided through local resources.
4.2. Balancing training	Balancing training for the veterans of work life. The disseminated service network for free choice – customers will collect their own training program from different modules.
4.3. Special expertise centre	The provided service focus on high expertise in one or two narrow fields and is recognized internationally.
4.4. Delivery centre	The local well-being services are delivered to the places where the customers and needs are.
5. Senior housing	
5.1. Living as a world citizen	The climate change has changed the globe so that it is impossible to identify one's own roots anymore as they are scattered around the world because of high levels of mobility and travelling.
5.2. Social entity	The network is your family – family is constantly recreated within the community in which an individual is involved.
5.3. Virtual entity	Seniors can be active even though there are physical restrictions. Social digital network is an essential part of daily life.
5.4. Long life	Senior citizens live longer and need longer term places because the medical science has successfully lengthened our lives dramatically.

4. Analysis of the scenarios and results

After the analysis of the content of scenarios, four scenario clusters were identified: ICT-driven, New practices to conduct work processes, Sustainability-driven, Well-being-driven, and the New use of spaces. Table 5 indicates how the different scenarios are allocated to different clusters. The number presents the number of scenario from earlier descriptive illustrations.

Table 5: Clusters of the scenarios of different space segments

	New practices in work processes	ICT	Sustainability	Well-being	New use of space
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Industrial place scenarios	1.4	1.4	1.5		1.1, 1.2, 1.3
Knowledge work-place scenarios	2.2, 2.4	2.1, 2.2		2.3	
Shopping centre scenarios	3.2	3.1, 3.2	3.3	3.1, 3.3	3.4
Rehabilitation scenarios	4.2, 4.3, 4.4		4.1, 4.4	4.2	4.4
Senior housing scenarios	5.2, 5.4	5.3	5.1	5.2	

The analysis of scenarios in accordance with four identified clusters show that the *New practices in work processes* seem to be the main driver of the scenarios of future work and living environments. Change of work practices was driving future development in all spaces and one to three scenarios in each space. However, the quantitative grounding can be used only as a weak signal. From content analysis, the following propositions can be drawn:

New practices in work processes cluster suggests that the part of work processes and practices are shifted towards digital environment. This affects both the behaviour and the environments where we act: virtual shopping in living room with simulations and haptic possibilities (*Scenario 3.2.*) has widened the traditional uses of living rooms to uses of cinemas, amusement centres or adventure parks. Will these actions take place at home in the future? Or are we going to do our shopping in science centres with the latest technology? Also, due to the new practices in work processes service concepts of spaces have evolved and are still evolving exponentially. The service offer for *Network nomad* (*Scenario 2.4.*) provides aspects of fully different service provision than traditional office concepts were able to offer in 2006 when the workshops were conducted.

ICT-driven cluster of scenarios indicates that there are two implications of the use of technological possibilities: development of smart environment which guides our activities or transformation of ways to conduct processes and it is partly interlinked with the cluster of new ways to conduct work processes. ICT-technologies and Internet of Things (IoT) affects how actors communicate with one another and enables better quality of both service delivery and operational management of built environments (*Scenario 2.1*). *Scenario 5.3* in *Senior housing* takes a similar approach in stating that, i.e. social needs can be fulfilled with virtual interface. However, because of vulnerability of ICT-technology, old practices can be adapted to new uses, which is proposed in *Scenario 2.2* of *Knowledge workplaces*.

Sustainability-driven cluster indicates that the environmental crisis can affect the global level and the climate change possibly resulting in dramatic changes in different continents and districts. This was discussed greatly in the *Scenario 5.1. Living as a world citizen* in *Senior housing* and in *Scenario 1.5. Mountain top production space* in *Industrial spaces*. The other aspect is related to energy-efficient and environmentally friendly behaviour and solutions and emphasized the significance of local resources. This was highlighted in scenarios in *Re-*

habilitation centres (Scenario 4.1. Experience centre and Scenario 4.4. Delivery centre) and in Shopping centre's Scenario 3.3. Community.

Well-being driven cluster covers different perspectives of the well-being of the user of spaces. It is a primary service offer in *Shopping centre Scenario 3.1. Wellness circus, Knowledge workplace Scenario 2.3. Care and love* and in *Scenario 4.2. Balancing training (Rehabilitation centre.)*. The significance of another aspect of well-being – community - has increased in scenarios in *Shopping centres (Scenario 3.3. Community)* and *Senior housing (Scenario 5.2. Social entity)* as well as in *Knowledge workplaces (Scenario 2.3. Care and love)*.

The *New use of spaces* cluster is highly important in *Industrial place* scenarios (*Scenario 1.1. Monumental industrial space, Scenario 1.2. Modular container factory, and Scenario 1.3. Multiuse production loft*). It indicates the need for spaces to be adjusted and used for different purposes, designed with different principles than traditionally or designed based on the principle that one actor, function or purpose takes place in a space for only a certain amount of time. The traditional value of the former use can be a new product as is indicated in *Scenario 3.4. Tradition centre in Shopping centres*. The *New use of spaces* is connected also to a *Scenario 4.4. Delivery centre in Rehabilitation centres*.

5. Discussion

In order for FM to proactively support organisations' core business and develop their services, a deep understanding of changing organisational environment is needed. Megatrends discussed by ISS (2014), Hinks (2002) and Nutt (2000) such as technological development, globalization, sustainability, demographical change and others affect the future of organisations, thus different needs for FM services arise.

Future research methods that are used in this paper represent how they can support the future orientation and proactive approach of facilities management. Futures approach promotes forward-thinking, widens perspectives which then increase the number of options available for decision-makers to prepare and manage the upcoming change (Saurin; Ratcliffe, 2008). The short response time to future events is important for organisations and FM service providers in order to stay competitive in global and fast-changing markets.

This paper analyses different future scenarios in five different spaces – Industrial Place, Knowledge Workplace, Shopping centre, Rehabilitation, and Senior housing. Based on the main drivers for future change, these scenarios are then clustered into five different categories: ICT development, New practices in work processes, Sustainability, Well-being and New use of spaces. These driver categories, recognized in this study, are consistent with the trends identified by Hinks (2002), Nutt (2004) and ISS (2014) and have an effect on all different spaces, thus all FM industry.

The development of ICT and Internet of Things (IoT) has influenced not only how built environment is treated but especially it changed and continues to change the ways how work is done. It empowers employees to work from any place and any time, thus changing the demand and usage of buildings. Remote and virtual work means more individualization and creates the need for tailor-made solutions (ISS, 2014). Diminished demand for industrial spaces and office buildings creates the need to reconsider and create new building use

strategies, thus, in many cases, change regulations in very conservative construction sectors. Overall focus towards sustainability and well-being leads towards system re-design and creates the need for services promoting active and healthy lifestyles.

Based on the literature and results of this study, we suggest that there are four topics for proactive facilities management to be taken into account. They are:

1. FM in virtual worlds

FM service providers can support this by e.g. studying the virtual paradigm and its opportunities and implications for the FM applications. Managing knowledge sharing within users on a global scale easily and quickly becomes strategically important for FM. Virtual communications and document sharing is exponentially increasing which might also cause some ethical and security issues like: which data belongs to who? Who is responsible for securing the data transfer? And similar. Ability to provide services remotely and fast becomes a competitive advantage for FM service providers and geographical location of customers has less effect on service delivery.

2. Dissemination of activities and new ways of doing daily activities, which require new ways of supporting clients

Facility managers can take a user-centric approach to developing services that support the tasks-to-be-done of the users instead of supporting each branch as we know it. Personalisation of FM services to support each user according to ones needs should become a main priority for FM service providers. The Internet of Things will bring opportunities to automate more activities for FM as well as to better understand the users and provide more productive spaces.

3. Responsibility and wellbeing factors as business drivers

FM service providers can support well-being by emphasizing individual user and his/her personal well-being in service offerings. Highly flexible spaces, better designs and new maintenance approaches are becoming more and more available due to a better understanding of the users and the building itself. FM has to get even closer to their customers and their core businesses in order to provide user-oriented services. Flexibility of work (time and location-independent work) creates challenge for FM and requires a new approach for FM to their own operations and service delivery.

4. Mixed and multi-use space segments

It is important for FM to break free from the standards and seek for synergies between different branches. The buildings are not anymore single-use buildings but the mixed-use spaces and it creates challenges for FM providers as their services are too segmented and traditional. Synergies between different services, service providers as well as ways of providing a service are needed in order to fully support client organisation. Facility managers should experiment with contemporary solutions and rethink the fixed physical construction paradigm in order to go hand in hand with the changing organisations and their needs.

The research is based on futures studies and scenarios are developed by the limited amount of participants. In order to receive different perspectives on developed futures, various ac-

tors (from users to researchers) were invited to future workshops. Still, the number of participants was small (15 people) and the results might be debatable. Even though the findings are limited to the Finnish business environment and context, the future scenarios of different branches and the future of FM may offer some insights to global level too. These results closely correspond to the trends and implications identified in previous literature, therefore it is possible to state that they are valid.

6. Conclusion

More and more facility managers understand the need of changes in FM field. A new, proactive and more strategic approach towards FM needs to be taken in order to meet ever-changing needs of their services' users. In order to plan, design and manage facilities strategically, a deep understanding of future trends and users' requirements is needed. To provide a dynamic view and help planning future FM strategies, future scenarios are created based on identified trends. These different future scenarios help organisations to prepare for possible changes and avoid the situation when "probable" future does not appear. Few megatrends, such as ICT development and globalisation, are affecting the FM industry in every branch and every scenario, and they need to be closely looked at to understand what it will mean not only for FM but also for other businesses and all society.

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Re-approaching the Meaning “Innovative Service” on Generating New Service Process: MEIJI Milk Express study case (fresh milk home delivery service) - Provider and User perspectives as innovative/innovated service

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This paper adopted two research methods: systematic literature review to identify how has been services defined as innovative beside the novelty determinant component identification allowing such definition; and single-case study, demonstrates the need of such clarification for services which indeed belongs to the past and re-introduced in present time. The analysis focuses on the MEIJI Company “new” delivery service and explores how the provider and users are able to identify the service as innovative. The findings here after reported give the degree of how it urges the need to identify novelty determinant components on the present time for similar cases.

1. Introduction

What is an innovative service?

Shall it be understood as service that “innovates” verb predominance approaching sense or innovation on/in even for the service? For non-native English speakers like different Latin based language: “service qui innove ou service (re)innovée ou service innovant”; “serviço que inova ou serviço (re)inovado ou serviço inovador”; once again in English: “Innovative service”, service that have been innovated or that innovates. Looking to questions introducing the conference it is easy to lead comprehension focus to newly generated services. But reflection towards novelty in and for (insisting on the difference language leading understanding matter) services available in this century. Appearing now a day or coming from the past?! In a simple analogy we can take reference of “fashion cycles”: inspirations of past (re-introducing renewed and improved version).

“Innovative”: verb or adjective (action, attitude, behavior or characteristics)?!

Meaning “New” or “Renewed” Service?!

Shall in this paper all notions, definitions and specificities of service be taking in importance: as process as product as well as set of characteristics in a product (Gallouj 1984) .

Service: comes from to serve, letting others do it to you, for you. So is that any “personal gesture” turn out in to an economic activity synonymous of innovating in service’s sector?!

It is convenient to talk about innovative services because services providers decided to do it for the user/client instead of letting it to be done by the client or only because it never was done before.

Taking in account details in a service as process and enlighten it as new when one of innovation types (radical, improvement and incremental) operates over specific detail.

Re-evaluating user/consumer’s decision on “participating” versus “non-participating” at the **Genesis** of innovative services – social dimension of co-creation of value; can we consider be in front of an infinity source of potential service? For that as soon as de future user decide to no longer do it on his own and waits for a service provider to take hand and do it for him.

How to measure the degree of novelty under such considerations?

Service engineering and R&D in services shall be the main way/place to identify innovative characteristic of.

But R&D in services is not adequately reflected in the productivity statistics and so underestimated. Here is an interesting concern to put at light researches on what to qualify as innovative service (Djellal et al 2003). Impossible to do not take on pair the productivity matter related to.

User/client/market-oriented services instead of traditional sense administrative public services got its word on innovative services: extending into complementing or not activities.

Food industry does not stay behind on the world servitization adaptation process. The new type of value creation is based on the offering product-service system (PSS). In an economy such as the Japanese one focused on the changing order: the proof MEIJI a very well-known and owner of an honorable reputation brings back to the light of the day an old fashioned service: Fresh Milk Delivery Service.

This subject pushes a review through all concerns around defining innovative service.

Let’s then apply evaluation modes suggested by previous reflections on this matter.

2. Research Methods

For the common sense believe: “Innovative Services” are those awaking the attention of the user (actual ones as well as potential ones) by a “difference” caused by an element not recognized by the user up until the moment the refereed service is available.

This paper essence idea is: a given innovative service can be considered as such by the moment it is seen by users alike and then become reproduced for the potential and future users.

Two methods have been used:

1. Systematic Literature Review: based on rigorous and reproducible steps that allow the linking of future research to questions and concerns posed by the past research (Thorpe et al. 2005):
2. Case Study Research: producing first-hand understanding (Yin, 2004), its ability to examine in-depth a case within its real-life context (Tavoletti,2007).

2.1. Systematic Literature Review

Data collection

Based on traditional systematic review process, the following set criteria have been established:

- EBSCOhost as the research database;
- All chosen articles were published in English;
- All articles were from 2000;
- Keywords used were: service, innovative, definition;
- Abstracts helped on final selection;
- Full reading of articles;

A total of 15 papers suggested by the database composed the dataset regarding to identify how has been services defined as innovative adjacent to the novelty determinant component identification allowing such definition.

Dataset analysis

Analysing the dataset there are some considerations to take in account: fully dedicated papers to innovative service definition are “inexistent”; the number of papers ranged by the database related to the keywords increased after 2010; topics were of a multidisciplinary nature but management predominance is easily noticed.

Results

Deepening the analysis it is possible to identify a lack of studies examining explicitly innovative services definition. Furthermore the generating process of new services also suffers same scarcity.

Focus was about innovations *in* service often entitled as “innovation service”. And this takes us back to preliminary distinction made for semantic matters.

However a brief and dual categorization allows ranging the read articles as follow:

- Innovation basis: all the literature measuring the degree of novelty.

AND

- Management basis: all the organizational structure support.

2.2. Case study

“Single-case studies can richly describe the existence of a phenomenon” (Siggelkow, 2007).

Through the diversified, performing and crowned by novelty Japanese service universe two cases were picked to embody this paper.

Adopting a descriptive introducing method the case is here by presented. Then follows the data analyse. In order to follow an ideal evaluation of the respective “Innovative” characteristic/adjective/behaviour questions ruled by a multidimensional approach supported the interviews.

Data collection

In order to respond to the paper aim the Case Study Research method was used to produce a “first-hand” understanding due to the ability it provides on examine in-depth a case with real-life context (Yin, 2004).

Interviewing (the “how”) service provider and service users by the belief only the lived experience by both side shall reveal the novelty (the “why”) degree contained by the chosen service.

All the interviews (providers and users) were guided by a pre-elaborated questionnaire which the targets could have in hand along interview moment.

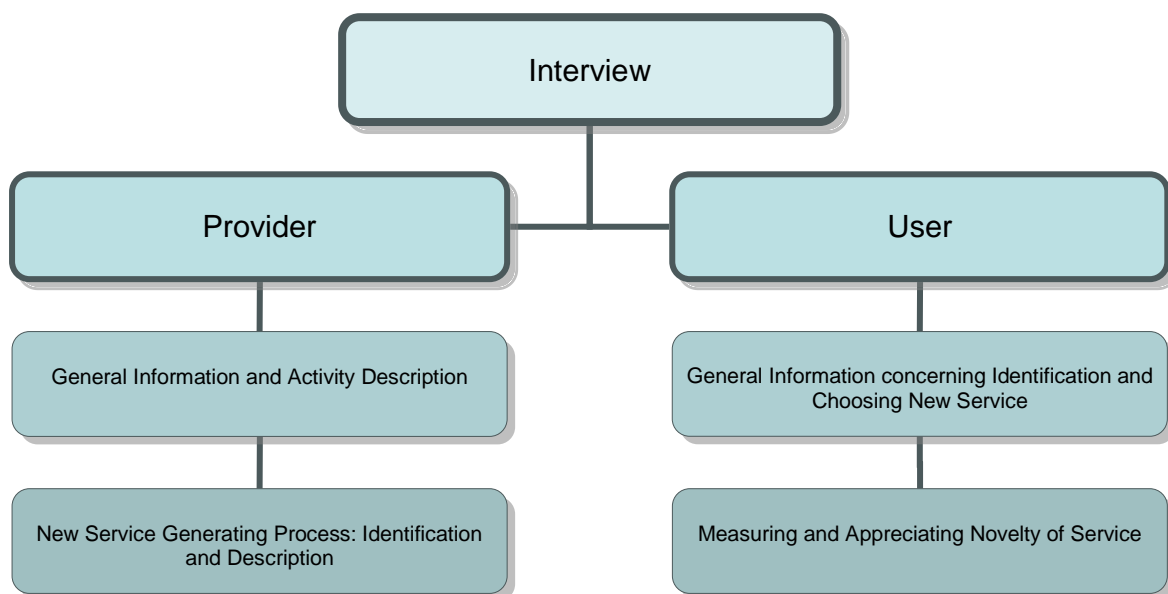


Figure 1: Interview key points. Source: Own elaboration.

Data analysis

A cross-interview analysis allowed insights from each interview compared to one and another.

3. Findings

Up-and-coming findings from the data analysis are here reported.

Service research universe after strong empowerment still have room for improvements on novelty degree measurements aside of continuous hard work on productivity measurements.

The paper insights aim to contribute on future brain storming(s) dedicated to improve construction of solid tools for innovative service identification, definition, classification, evaluation and so on.

Innovative service generating process

Every and any process is considered as a series of actions or steps taken in order to achieve a particular end in general. Here in particular to generate services that is new, original and introduces changes taking in consideration respective creative origin. Undeniable additional perspective shall be taken when facing brand new services; especially when using existing tools for identification, definition, classification, evaluation and so on.

Despite the semantic distinction concern launching the essence idea of this paper, data indicated in the case for MEIJI Corporation decision to introduce answered the market demand of servitization.

The innovative service generating process appears here like obeying to context and conjuncture exigencies. And in simple way we approached this process by the angle of value co-creation by users' deliberation on self doing (or not) versus service provider make of users decision a business opportunity.

***Cyclical Momentums* definitions of innovative services**

Timing for questioning overcame changes seems discarding any order or regent law.

Suggesting to revisit or to make a retrospective analysis of "new" or "renewed" or "re-introduced" service among existing analyses supported by this paper aims to call attention up on innovative service distinct from service innovation. To be ranged as revisiting a concept or notion paper shall belong to future readings.

Cyclical momentums definitions get its "inspiration" by the time line simple observation: In a moment at high demand and supply response is followed by dropping aside for alternative solution; and contextual reconfigurations re-bring on vogue former solution.

What to say for the milk delivery service staging and solid comeback?

Looking at the choice made by MEIJI Corporation to bringing back from past a service instead of suggesting fully brand new creation of service type suggests new insights regarding innovative service identification, definition, classification, evaluation and so on. This makes questions the use of fashion cyclical returns as analogy for this specific case.

Become a servitization strategy applied success company on Food Industry

Innovating and integrating successfully as moving into service universe is usually made facing difficulties. This is said because mutations on management must be done. Service businesses come into the long living different kind of organization.

MEIJI Corporation (re)introducing the delivery service made use of its market needs knowledge following business strategy and niche opportunities on Food Industry. A whole management section of Meiji Dairies Corp.'s home delivery was created. Moreover a social dimension is to be taking in account: aging population matter. Therefore the market could and still can expect further growth in sales and profits as the population still ages.

We here assist to an adoption of the servitization strategy making full use of knowledge acquired by MEIJI Corporation. Being a hard core food industry organization, the company could by adding a service add knowledge of its own market: servitization strategy adoption requires the acquisition of new knowledge (Leoni 2015). This implies that information and knowledge management systems have to support the dissemination, gathering, and application of knowledge (Ward and Graves, 2007).

It would be very interesting to make a comparative analyze between types of delivery services on food industry available for users. A good example and alternative reason of dropping aside on time of the milk delivery: grocery delivery service. The milk being an item to certainly belong the list, we shall not forget some requirements to have such service: punctual need, over determined amount of purchase, distance from store, etc. according to provider's means to provide such service. In contrary, milk delivery service for MEIJI is a specific kind of item, on a daily basis, using shops as distribution points covering an identified perimeter. Another good example is the convenience stores. First on line to represent Japanese service universe they are everywhere with a logistic system defying any and every activity. Any user could just go for his milk at the street corner. And still delivery milk service can step out the scene once the delivery channels provide highly predictable and stable demand according to providers and they play over food safety winning hearts among users and costumers.

Users and costumers perspective

The success of any novelty is related to the market reaction.

After discovering the novelty a major concern for respective suppliers is the taking in of the solution as alternative among existing choices.

Following MEIJI Philosophy of extreme importance attached to clients' feedback we can make direct appreciation of the value of co-creation as well as an improvement of knowledge concerning this specific service. At same time it allows the Corporate a boost on delivery outlets' promotional activities as it is easier to pitch new products.

Another plus for this service is the client advising potential ones to become actual clients. Positive experiences benefits from the neighbors "bouche-à-oreille" information divulgation current.

4. Discussion and conclusions

There is always room for growth in producer services activity, particularly in the information field and chiefly for those related to R&D functions: innovative services just come from it tricking mind as for the question what comes for "the egg or the thick-en".

In further and deeper multidisciplinary analyses this revisiting proposal can reveal policy implications, for example. And this can be of different nature: social (aging population), environmental ("milk man" dislocation versus all service users' dislocation to purchase the item), etc.

The chosen case might have a prime individual "wellbeing" contribution and "solving problem" visage as above different nature policy implications can refer to. The system offered by the delivery service has more than primer social effect. As they have shops centralizing the departure point of fresh product environmental issue has also its dimension taken in account. Same for the employment economic one: the more the number of clients grows, the more employees will be needed to respond with service quality.

We hope to see more and more analyzing study cases adopting "multi-criteria and system dynamic perspectives" evaluation. This empowering evaluation of the evolution through the "Innovative Services" universe we now live in. Details can be revealed and handled by accurate tools as they're caught by their mutating shapes in the ongoing generating new service process.

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Appendix A



<https://www.meiji.co.jp/english>

Corporate Profile

Trade Name	Meiji Co., Ltd.
Main Businesses	Manufacturing and sale of confectioneries, milk and dairy products, and other foods
Head Office	2-10 Shinsuna 1-chome, Koto-ku, Tokyo 136-8908, Japan
President	Kazuo Kawamura
Established	December 21, 1917
Paid-in Capital	¥33,646 million
Annual Sales	(Fiscal year ended March 2015) ¥1,021,806 million
Number of Employees	(As of March 31, 2015) 10,940
Meiji Group Annual Sales	(Fiscal year ended March 2015) ¥1,161,152 million
Number of Meiji Group Employees	(As of March 31, 2015) 16,559

Corporate History

1906	The former Meiji Sugar Co., Ltd. (hereinafter “Meiji Sugar”), the forerunner of the Meiji Group, is established.
1916	Tokyo Confectionery Co., Ltd. (hereinafter “Tokyo Confectionery”), the predecessor of Meiji Seika, is established.
1917	Tokyo Confectionery merges with Taisho Seika, a subsidiary of Meiji Sugar.
	Tokyo Confectionery starts manufacturing caramels and biscuits at its Okubo Plant.
	Kyokuto Condensed Milk Co., Ltd. (hereinafter “Kyokuto Condensed Milk”), the predecessor of Meiji Dairies, is established.
	Kyokuto Condensed Milk starts manufacturing condensed milk and other products.
1920	Meiji Sugar Co., Ltd. establishes Meiji Shoten (later Meiji Shoji).
1924	Tokyo Confectionery Co., Ltd. changes its name to Meiji Seika Kaisha, Ltd.(hereinafter “Meiji Seika”).
1926	Meiji Seika launches "Milk Chocolate."
	Meiji Seika launches a cocoa powder drink mix.
1928	Meiji Seika launches "Meiji Milk."
1940	Kyokuto Condensed Milk changes its name to Meiji Dairies Corporation (hereinafter “Meiji Dairies”).
1951	Meiji Dairies launches "Soft Curd Meiji Infant Formula."
1953	Meiji Dairies launches "Meiji Fresh Cream."
1961	Meiji Seika launches "Marble Chocolate."
1962	Meiji Seika launches "Almond Chocolate."
1968	Meiji Seika launches the Japan's first savory snack, "Karl."
	Meiji Dairies launches baby food products, "Meiji Baby Rice Gruel" and "Meiji Infant Kaju Orange Juice."
1971	Meiji Dairies launches "Meiji Plain Yogurt."
	Meiji Seika launches a sugar candy, "Chelsea."
1972	Meiji Shoji, Meiji Seika's sales arm, transfers its dairy products business to Meiji Dairies.
	Meiji Seika merges with Meiji Shoji.

1973	Meiji Dairies launches "Meiji Bulgaria Yogurt."
1974	Meiji Seika (Singapore) Pte., Ltd. is established.
1975	Meiji Seika launches the chocolate snack, "Kinoko no Yama."
1976	Meiji Dairies launches the frozen food, "Pizza & Pizza."
1980	Meiji Seika launches "SAVAS," a series of protein for athletes.
1983	Meiji Seika launches the OTC drug, "ISODINE UGAIGUSURI."
1986	Meiji Dairies launches the enteral formula, "YH-80."
1988	Meiji Seika launches "Kaju Gummy."
1989	Meiji Dairies establishes CP-Meiji Co., Ltd. in Thailand.
1990	Meiji Dairies launches a soft margarine, "Meiji Corn 100."
1992	Meiji dairies launches "Meiji Hokkaido Tokachi Cheese."
1993	Meiji Seika launches "Mellykiss."
1994	Meiji Dairies launches "Meiji Essel Super Cup Ultra Vanilla."
	Meiji Seika launches "Ginza Curry."
1995	Meiji Dairies launches the sports performance drink, "VAAM."
	Meiji Dairies launches the enteral formula, "Mei Balance."
1996	Meiji Dairies launches "Meiji Butter in Tube 1/3 Calories."
	Meiji Seika launches the chocolate snack, "galbo."
1997	Meiji Seika launches "Xylish Gum."
1998	Meiji Seika launches "Chocolate Kouka."
1999	Meiji Seika launches a chocolate-snack, "Fran."
2000	Meiji Dairies launches "Meiji Probio Yogurt LG21."
2002	Meiji Dairies expands the distribution of "Meiji Oishii Gyunyu" nationwide.
	Meiji Seika launches "Amino Collagen."
2007	Meiji Dairies launches the cube-type infant formula, "Meiji Hohoemi Raku Raku Cube."

2008	Meiji Dairies launches the sports nutrition beverage, "SUPER VAAM."
	Meiji Dairies launches the fresh cream for professional use, "Meiji Fresh Cream Ajiwai."
2009	In April, Meiji Seika and Meiji Dairies establish a joint holding company "Meiji Holdings Co., Ltd." (hereinafter "Meiji Holdings") and integrate the management.
	Meiji Dairies launches "Meiji Probio Yogurt R-1."
2010	Prepares the Meiji Group 2020 Vision as a long-term business management strategy.
2011	In April, Meiji Holdings reorganizes Meiji Seika and Meiji Dairies; Meiji Co., Ltd. (hereinafter "Meiji"), a food company, and Meiji Seika Pharma Co., Ltd., a pharmaceuticals company, begin operation.
	Meiji launches new margarine, "Meiji Healthy Soft Offstyle."
2015	Meiji launches "Meiji Probio Yogurt PA-3."

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Fruit wine festivals and producer visits as marketing channels and local tourist attractions

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Key Words: Fruit Wine, wine tourism, festivals, entrepreneurship, experience

1. Introduction

In this paper we investigate how fruit wine festivals (Cavicchi and Santini 2014) and producer visits (Croce and Perri 2010) are used to promote the new field of modern fruit wine (including gastronomic cider) and whether these promote local tourism. Fruit wine has been re-invented, particularly in Denmark, by a new scientific approach to cultivation and production methods resulting in a new type of gastronomic products. Hitherto, fruit wine in Denmark has mostly been used in the low-to-medium priced forms of cider and dessert wine. But modern fruit wine may be considered parallel to grape wine and can be used more widely as an aperitif, an accompaniment to meals or even used in food. This wider use and the basic idea of fruit wine as an alternative to grape wine is new. The use of grape wine and wine tourism has been investigated extensively (e.g. Osmond and Anderson 1998; Hall et al. 2000; Williams 2001; Carlsen and Charters 2006; Hall and Sharples 2008; Croce and Perri 2010; Mason and Paggiaro 2011; dal Bianco et al. 2013; Nella and Christou 2014; Cavicchi and Santini 2014), but not the use of fruit wine and its relation to tourism. The purpose of this investigation is to see how some fruit wine producers in Denmark attempt to use festivals and producer visits to create an interest sphere

and promote sales, to find the drivers and barriers behind such attempts, and to see how effective fruit wine festivals and producer visits are in creating a new interest sphere. Further, we analyze how much this contributes to development of local tourism and the possible barriers for this.

The festivals and producer visits are results of entrepreneurial activities (Binks and Vale 1990; Fletcher and Watson 2006; Fuglsang and Sørensen 2013). Some of the activities are even carried out in entrepreneurial networks (Johannisson 1988; Klyver and Hindle 2007), for example the fruit wine festivals. The focus of this paper, however, is not on the entrepreneurship per se or the technical innovations, but on how the entrepreneurs attempt to promote the fruit wine. Our approach is to see this as a market innovation by creating a new interest sphere of fruit wine in a part of society – which is a marketing innovation (Nyström 1990) – by using established, locally oriented tourism means (festivals and producer visits).

The investigation is carried out through case studies in Denmark of four fruit wine producers and of two annual instances of a fruit wine festival.

In the paper we first present the background – the development of modern fruit wine as a new gastronomic field and the fruit wine producers' attempts to create a new interest sphere and promote sales of the fruit wine. Next, we present the theoretical elements that are needed to understand and explain the producers' use of festivals and producer visits as means to promote modern fruit wine. In the next section we analyze the data material and finally a conclusion with a discussion of the innovative theoretical perspectives this investigation leads to will follow.

2. Background

2.1 Modern fruit wine

Fruit wine is undergoing gastronomic renewal. New, scientific cultivation and productions methods and the use of local varieties of fruit, primarily apples and cherries, based in local "terroir" (Groze and Perri 2010) are bases for new types of fruit wine with high gastronomic value. Producers are experimenting with new fruit varieties, new cultivation methods (using different fertilizing methods, land areas, harvest times, apple and cherry varieties etc.) and new production methods (storing temperature, fermentation, chemical control etc.). For example, they experiment with apple ice wine by storing the wine outside during the winter. University scientists are investigating and developing cultivation and production methods that the producers use. The development from craftsmanship to scientifically based production which grape wine has undergone the last fifty years (emphasizing oenology) is also happening in modern fruit wine production. Many of the fruit wine producers embracing such a new approach have been producing fruit wine for less than ten years.

This development has led to new fruit wines with a higher gastronomic quality than traditional cherry and apple wines. The nuances of flavour and combinations of sweetness and acidity have improved resulting in a variety of refined sophisticated tastes. The producers experiment with wine from many kinds of fruit including rhubarbs, gooseberry, elderflowers and black and red currants, however cherries and apples clearly are the most used fruits. Apple cider has internationally been developed to a high gastronomic level; however, the Danish fruit wine producers have even develop it further into a sparkling wine that can be used similar to champagne.

Fruit wine has traditionally been seen by users as having limited use, mostly as aperitif or as a beverage suited for certain specific dishes such as “galettes”. A challenge for the modern fruit wine producers thus is to widen the field of use so that the wine is connected to food consumption. For example, to make it mainstream to drink fruit wine with many kinds of food and use it in dishes to increase the gastronomic value of them.

For the entrepreneurs who produce the new type of fruit wine, the marketing and storytelling about the wine is crucial to put fruit wine on the consumers’ consciousness and establish an interest sphere and a business. Wine tourism is one means of doing this. The production of fruit wine is carried out locally and the tourism that the fruit wine production may generate is also partly local (except the fruit wine festival, which, however, brands the localities as the fruit wines are often presented as “from locality x”).

2.2 Creation of a new fruit wine experience Interest Regime

The producers use fruit wine festivals to simultaneously market their own products and create a general interest in modern fruit wine – an interest sphere, which we here shall term Interest Regime using a concept from the French sociologist Laurent Thévenot (2006, 2007). Both the festival and producer visits are local and thus can be classified as tourist activities that contribute to development of the general local tourism and the destination (Leiper 2000). However, as promotion of fruit wine sales and creation of a modern fruit wine Interest Regime, the festivals and producer visits also have the wider aim of promoting fruit wine sales and export.

Consumption of fruit wine is part of the experience economy (Pine and Gilmore 1999; Sundbo and Sørensen 2013) as it is purely hedonic (Caru and Corva 2003). Festivals and producer visits are experience activities as well as promotion means based in the currently hyped experience economy (Pine and Gilmore 1999; Boswijk et al. 2007; Mossberg 2007; Sundbo and Sørensen 2013). The festival and producer visits are also used to get publicity in national and international media. These activities can be understood as experiential

marketing (Smilanski 2009), aiming at promoting sales of fruit wine and a general fruit wine Interest Regime through the creation of experiences.

3. Theory

The paper is primarily empirical with an inductive interpretation of the results. However, some theories are bases for our understanding of the development of local fruit wine production and fruit wine tourism. Three theory traditions are bases for the empirical analysis. One is Thévenot's theory of Interest Regime (Thévenot 2006, 2007) which can explain the attempt to create a wider interest sphere in the society. Also, the producers intend to promote and create sales via festivals and producer visits and the theory of experiential marketing (Smilanski 2009) is used to understand this part of their behavior. Finally we emphasize the emerging research tradition of food and wine tourism. This tradition does not contain one fundamental core theory, but rather consists of scattered generalizing conclusions on empirical research (Hjalager and Richards 2002; Hall and Sharples 2008; Groce and Perri 2010). Nevertheless, these conclusions can be used to ask research questions for the new fruit wine tourism phenomenon and assess whether our analysis can contribute to this tradition.

3.1 Interest Regime

The theory of Interest Regime is suitable to understand how a group of people develop a common interest – in this case in fruit wine as a gastronomic field with all the aspects of taste, use and knowledge about cultivation, production and so forth. The idea of Interest Regime is based in the idea of social practice, which has been a concept and approach within sociology that has emphasized empirical social construction by groups of people of social phenomena (Gherardi 2006; Corradi et al. 2010). The theory used here is based on Laurent Thévenot's (2006, 2007) theory of regime of engagements. Thévenot develops his and Boltanski's earlier theory on economies of worth (Boltanski and Thévenot 2006) into a theory on how individuals are engaged in political and market activities. He defines three regimes of this engagement: familiar engagement where the individual's interest is personal and the social practice carried out in small, tight communities; engagement in a plan where the individual carries out an interest as a plan in common with other people outside the community; and justifiable engagement where the individual is engaged by the public order, which is the strongest determinant.

We can not apply Thévenot's regimes directly on the development of fruit wine as an Interest Regime. His theory is oriented towards explaining political power and discourse while the explanation of development of interest for fruit wine concerns a more personal sphere (wine consumption and meals) and experiences, which often have a hedonic element (Pine and Gilmore 1999; Jantzen et al. 2012; Sundbo and Sørensen 2013), which is not explicit in Thévenot's theory. However, we can base the understanding of interest regimes on his two first regimes. The regime of engagement in a plan contributes the

elements of understanding individuals' engagement in fruit wine as a common social movement, while the regime of familiar engagement contributes an understanding of wine consumption and meals as a social activity in the family or group of friends and an enjoyment of fruit wine that has hedonic elements.

The formation of the fruit wine Interest Regime is a social process in which individuals and common structures interact (cf. Giddens's (1984) structuration theory). Media – mass media and ICT-based social media – play a main role in the formation of the Interest Regime.

3.2 Experiential Marketing

One of the newer developments within the field of marketing is the idea of experiential marketing (Schmitt 1999 and 2003; Elliot and Percy 2006, Lenderman 2006). The idea of involving experience elements in marketing in order to influence or create an emotional impact on potential or actual consumers is far from new. This has been an important element in creating a recognizable brand to which consumers can relate (Schmitt 1999, Elliot and Percy 2006). Likewise, marketing has played a role in creating the overall customer experience (Pine and Gilmore 2002; Schmitt 2003). However, in experiential marketing an event or similar live experience forms the central core element of the entire marketing strategy.

Experiential marketing exists in various different theoretical and practical conceptualisations. Here we use that of Shaz Smilanski (2009). In most marketing approaches there can be a multitude of marketing communication channels. In experiential marketing, the central element is the live brand experience. It should be an experience in order to leave a lasting imprint in the memory of the customer; it should be a brand experience as it relates not only to a product, service or experience offering per se, but more so to an overall desired impression of the offering and the producer behind it; and it should be live to be simultaneous and allow for interaction with the customers. As for experience content, it should communicate what Smilanski (2009 p. 6) refers to as "the big idea" which is the intended impression on the end consumer. This stems not only from the properties of the product, service or experience being marketed, but also from the brand personality or intended identity of the producer. The live experience often includes one or more memorabilia.

Such a live brand experience can either be direct and take place face-to-face with customers, or it can have an indirect form, for example live television broadcasts or through online virtual worlds. What is important is that the event is live. It should immerse the customer in the brand offering by surrounding the customer with multi-sensory inputs creating a live involvement and pre-occupation with the offering. In this case of investigation, the brand offering is

replaced by the overall phenomenon of modern fruit wine. Thus the customer should be immersed in multi-sensory inputs during the live event.

This does not exclude other more traditional marketing channels. In fact, quite the contrary: It includes a variety of other marketing channels such as advertising, word-of-mouth, digital marketing and field marketing. But experiential marketing is a holistic and integrated approach in which the live brand experience forms the central core element and the other marketing elements serve as amplification channels around the core element. This constellation can allow the core element to be used in all other touchpoints with end customers.

Importantly, this integrated methodology built around a “big idea”, the live brand experience, should not be a tactical aftermath or supplement, but rather a strategic element planned from the beginning and forming the central point of origin for the overall marketing effort. It should combine asynchronous mass marketing raising awareness more generally among potential consumers with more live direct marketing aiming at creating a stronger, more personal bond between the producer’s offering and the end customer (Smilanski 2009 p. 28). The ideal is to transform the end customers into advocates or even evangelists for the offering, in this case modern fruit wine in general.

3.3 Wine and food tourism research

A quite comprehensive literature on research of general food and wine tourism demonstrates that gastro-tourism (tourism where people travel with the aim of experiencing meals, food and wine) is a growing field (Tourism Recreation Research 2001; Journal of travel and tourism marketing 2003; Groze and Perri 2010; Cavicchi and Santini 2014). Without the concept being used, the research demonstrates that the gastronomy Interest Regime is a growing field in many societies (Hjalager and Richards 2002). Wine tourism has also been researched particularly (Carlsen and Charters 2006), which has led to models for managing and marketing wine tourism. Nella and Christou (2014) have segmented wine tourists according to their involvement with wine. They found that the more involved winery visitors are in wine interest, the more they were interested not only in the wine, but also visiting other wineries and buy wine afterwards. The low-involved people’s motive for visiting wineries was rather that they were part of a group. Mitchell and Hall (2003) found that high-involvement visitors are more likely to visit wineries year-around (and thus create year-around tourism and wine sales). These results indicate that the Interest Regime concept is useful in understanding customers’ engagement with fruit wine and that the producers should emphasize particular segments in their attempt to create a fruit wine Interest Regime to market their fruit wine.

Wine festivals have been investigated as a wine marketing as well as a tourism activity (Hall and Sharples 2008). Yuan et al. (2004) made a survey to visitors at a wine festival and found that interest in wine was the most important motive to visit the festival followed by interest in experiencing festivals. Family togetherness and socialization were motives of less importance. This indicates that wine festival attendants mostly are people involved in the wine Interest Regime. These had higher education and income than those mostly interested in festival and social activities (Yuan et al. 2004). Mason and Paggiaro (2012) introduced a stimulus-response model to explain visitors' behavioral intention in a food festival to re-visit the festival or buy products afterwards (which is an effect of their satisfaction). This intention is dependent on a positive emotional experience, i.e. what happens to them during the festival. The festivalscape (the physical environment) is only influencing their satisfaction indirectly via the experiences of what happened in the festival. This underlines the importance in an experience marketing approach to understand wine festivals. Robinson and Clifford (2007) found that authenticity is an important factor in creating a good experience in food and wine festivals. Beverland et al. (2001) have introduced a theoretical life cycle model for wine festivals which says that in the beginning wine festivals are local and focused on selling the local producers' products. Later they become more national or global, emphasizing media interest and mass marketing.

Producer visits have also been investigated. Sparks (2007) has studied potential wine-tourists' intention of taking a wine vacation. These intentions are determined by general wine interest, experience with wine and the destination. This may be interpreted as a wine Interest Regime. Carlsen and Boksberger (2015) in a literature review conclude that success of producer visits, i.e. that the visitors get a good experience, depends on the personnel's knowledge and skills about all aspects of wine production. This underlines that wine marketing via tourism should be addressed to an audience with a particular Interest Regime, not to tourists in general. Mitchell and Hall (2001) have studied the purchasing behavior related to producer visits. They conclude that females are more receptive to the visit experience than males, however, they do not buy more wine in place, but do so in the future. Telfer (2001) demonstrates that clustering, for example establishing a wine route or a wine village, is more efficient for wine sales than single producers marketing their wine visits. To understand how this is done Dodd and Beverland (2015) have proposed a wine tourism life cycle model according to which cellar door sales in the first phase is used to survive by increasing sale from the winery. Later on, greater distribution channels and wider promotion to build brand awareness is introduced and is connected to events (such as wine festivals) branding wine in general and the particular producer.

Although they attract a particular wine Interest Regime segment, Festivals and producer visits may attract tourists more generally to local communities (Williams 2001). This may, however, also imply dangers for the communities. Too intensive food and wine tourism may destroy environmental, social and economic sustainability (Poitras and Getz 2006).

4. Methods and material

The methodology used in this study is inductive consisting of qualitative observations and interviews, as well as quantitative survey analyses. The research consists of two parts: 1) The festival is investigated through visitors surveys and observation. We have interviewed the visitors using a structured questionnaire with descriptive variables that we have predefined, and this was supplemented with observations. We have investigated two instances of the festival, one in 2014 and one in 2015. 2) We are engaged in a long-term development project with four fruit wine producers, which also involves a group of biologists who help the producers develop new fruit wines, and engineers who are developing a device that can measure the chemical components of fruit juice and fruit wine. We have made observations of the destinations (Gans 1982) and interviews with the producers. This is the basis for the investigation of tourist visits to the producers.

4.1 Material from the investigation of the festivals

The fruit wine festival took place at a manor house (Frederiksdal) in Western Lolland, an island in the south-east peripheral region of Denmark with extensive tourism activities. The manor house is the largest and most well-known fruit wine producer in Denmark. The festival, which lasted one day each year, was open to all, an admission fee was charged and in the festival area were many producers that presented and sold their fruit wine and cider, guided tours to a cherry orchard, demonstration of food with fruit wine (the food could also be bought as meals) and presentations on fruit wine. Each festival was visited by about 700 people.

The survey was carried out as follows: The interviewers (2 in 2014, 6 in 2015) were placed at different spots and selected visitors that passed by randomly. Thus the selection criteria were mainly simple random selection. However, they had instructions to select different types of visitors according to age, sex and whether they came in large or small groups or individually. The sample should thus be representative. The sample in 2014 was 44 visitors (about 6% of the visitors) and 93 in 2015 (about 13%). 3 wine merchants, 2 professionals (chefs, cooks, sommeliers etc.), 2 journalists and 37 consumers were interviewed in 2014. 7 wine merchants, 11 professionals and 75 consumers were interviewed in 2015. The interviewers performed an oral conduction of pre-

printed questionnaires. The reliability of the survey was ensured by the random selection of interviewees and the survey was repeated in 2014 and 2015.

The survey with fixed questions and answering categories was descriptive. It investigated the following factors (each factor measured by several variables): Background (occupation, age, gender, residence). Whether visitors were professionals (wine retailers, chefs, journalists etc.) or consumers. For professionals: Whether they sell/use fruit wine, which type, how they use it (chefs and restaurant owners), whether they would serve/sell more if the quality increases and which price they charged for the wine. For consumers: How often they drink fruit wine, which type, and the field of use they see (aperitif, drink to meals, use in food), and how much they will give for a bottle. The validity of the survey is tested by comparing to results of the qualitative investigation.

In the survey we have observed a bias in the 2015 material as 60% of the interviewees were male (see table 1) (while the gender distribution in 2014 were equal). This cannot be seen as an expression of more males visiting the festival in 2015; it could also be a bias in the sample. This methodological bias has been controlled by analyzing whether the two genders had different results in the other variables. This was not the case, thus this gender bias does not influence the overall results significantly.

A number of qualitative observations (Veal 2011) were also made at the festival. These were carried out in the entire festival area throughout the day to see how visitors interacted with the producers and with the fruit wine. The observation process was partially formal and systematic involving different observers making iterative sampling regularly in the form of photographs; but it was also partially unsystematic as the observers improvised according to the festival activities and behaviour of the festival visitors. The observers used ad hoc criteria, albeit within the predefined frame of observing how visitors interacted with the producers and products. Besides the photographs, data recording was in the form of schematic drawings of the festival layout including an assessment of the distribution of visitors at various times, and qualitative field notes. After the festival days, the observers and interviewers were themselves interviewed on tape during a debriefing by the researchers.

4.2 Material from investigation of producer visits

We have followed four producers during two years by visiting and interviewing them, made conversations, organizing experience and marketing activities for them, participated in project meetings with them and exchanged information about the producers with the other researchers in the project (the biologists). We have thereby collected material, which is observation (Veal 2011), short, informal interviews, producers' presentations at meetings and documentary material.

One of the issues that we have investigated in this course is the producers' attitude towards visits and other promotion arrangements in their place. Only one of the producers has used producer visits as a more extended and regular activity. This producer has been interviewed for one hour about his producer visit activities using a structured interview guide.

The validity and reliability of this material has been ensured by the different methods used, which makes it possible to cross-control the information.

5. Results

3.1 The fruit wine festival

The festival, which has taken place three times, lasts one day each year. Though relevantly located at the production place of the largest producer of modern fruit wine in the country, its remote geographical location in a sparsely populated area means that many visitors are local. Having paid an entrance fee, visitors are given a glass for wine tasting, which they can keep and take home when they leave. They are then admitted into the manor area, which is not normally open to the public. In this area, two large barns are converted into temporary market places in which each producer has a booth. There are also a few booths selling food as well as several booths doing demonstrations such as how to cook or make desserts with fruit wine. There are also special areas in which presentations and group discussions can take place. At the end of one barn are cherry wine production facilities which the visitors can see up close. Outside the barns is a lawn with a few benches. There is also a tractor pulling a little wagon, and with regular intervals it offers visitors a guided tour of the manor grounds including an oral presentation on the history and current status on fruit wine production at the manor.

Most visitors were consumers. The results in the following tables and figures only concern consumers. At the end of this section we will briefly describe the attitudes and use of fruit wine for the merchants and professionals.

In table 1 are characteristics of the interviewed festival guests in 2014 and 2015 listed.

**Table 1 Interviewed fruit wine festival visitors (consumers)
Percentage**

Age – years	2014	2015
Under 31	23	15
31-50	42	35
51-70	26	44

Over 70	9	10
Gender		
Male	48	60
Female	52	40
Adress		
Copenhagen (metropole)	41	37
Town	16	43
Countryside	34	20
Abroad	9	0
Occupation		
Servants in higher position	32	38
Servants in lower position, workers	29	18
Self-employed	16	18
Housewife, retired	13	18
Student	10	9

In 2014 a little less than half of them came from the local area and a little less than half from Copenhagen. About 10% came from abroad. Most visitors were between 31 and 50 years old in 2014 while they were between 51 and 70 years in 2015. The visitors had become older from 2014 to 2015. They also came from different urbanized areas: 34% came from countryside (mainly around the manor house) in 2014 and only 20% in 2015. The occupation of the visitors was slightly changed towards a higher status level in 2015. All this indicates that the visitor group has become more “urbanized” from 2014 to 2015.

This demonstrates that the fruit wine producers have succeeded in getting middle aged (and thus able to buy) peoples’ attention to the fruit wine. All occupation types were represented. However, employees at managerial levels were over-represented. This demonstrates that the interest for fruit wine is quite socially widespread but with the supposed front runners or elite (middle age high salaried employees and managers) as the most interested and possible opinion leaders (Katz and Lazarsfeld 1955).

We have asked the visitors’ attitudes towards, and use of, fruit wine, particularly how often they drink fruit wine and their understanding of what it can be used for. Mostly people drink fruit wine rarely (once a month) (figure 1). More people in 2015 answer “often”, but more also answer “never”. Most people in 2014 only see the possibilities of using fruit wine as apéritif while more people in 2015 see a wider use – to meals and in food (figure 2). The visitors

use apple and cherry wines, which are the most commonly produced ones. Very few interviewees mention other berries or fruits. To most of the festival guests, fruit wine still is a new, experimental experience. They have no traditions for, and most of them no clear idea of, how to use the fruit wine

Figure 1 How often do you drink fruit wine?
Percentage

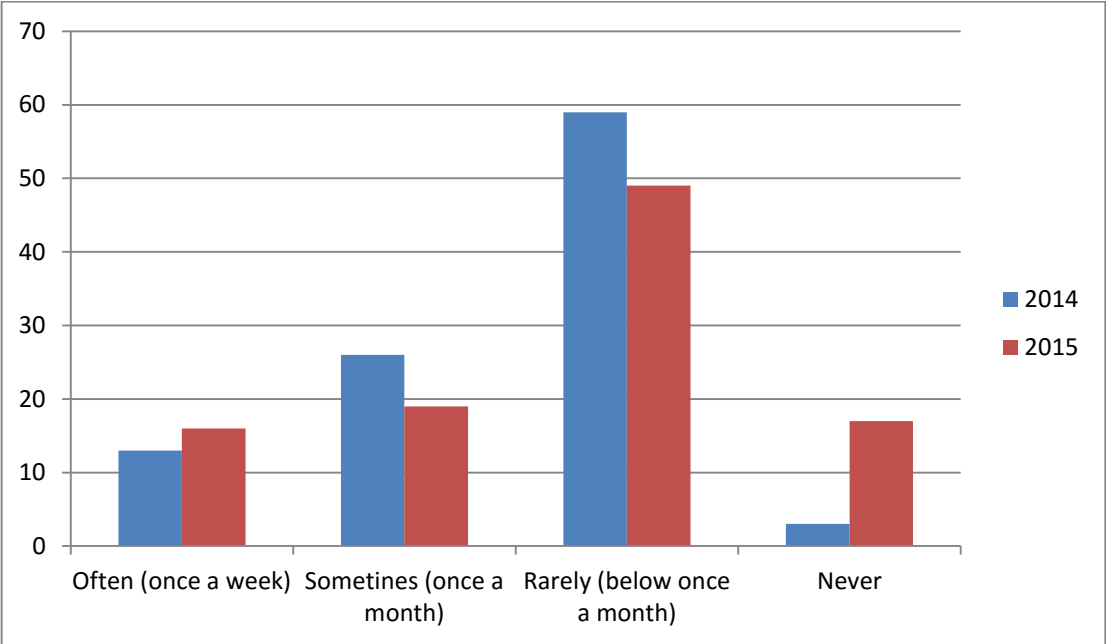
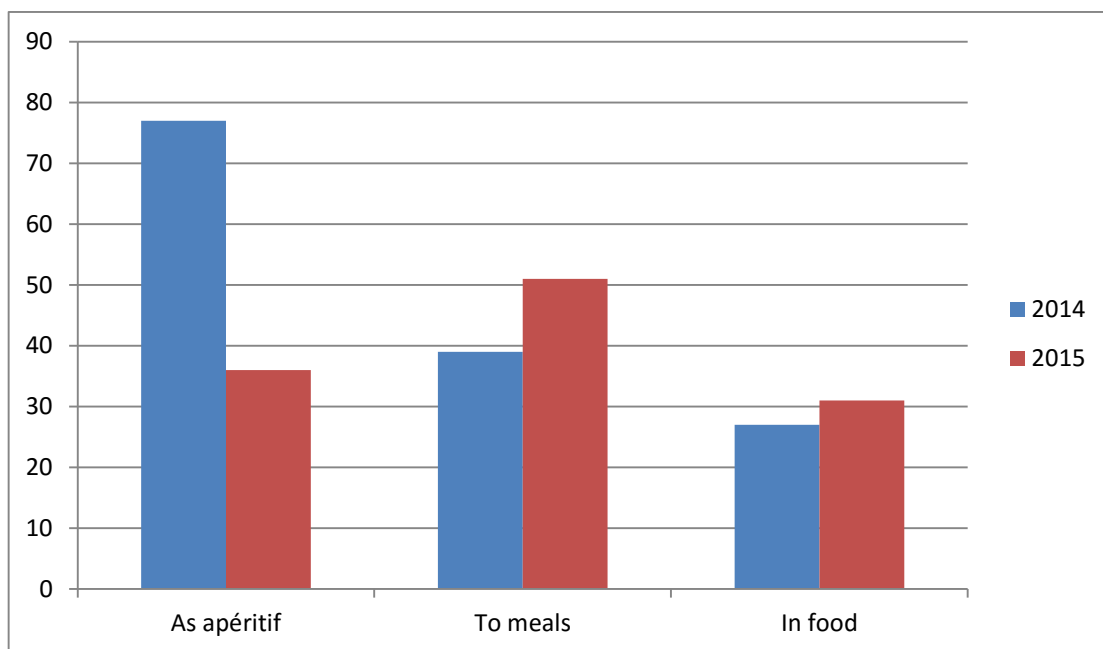


Figure 2 Use of fruit wine
Percentage answering



A few professionals (wine merchants, chefs, food journalists etc.) visited the festivals, which got much publicity in a couple of Danish food magazines in 2014. The professionals were in 2015 not more frequent users of fruit wine than the consumers. Neither did they see a more wide use of fruit wine. They also came looking for inspiration. They believed that there is an international niche market for fruit wine and they will sell/serve more fruit wine if the quality is further increased.

5.1.1 The festival as experiential marketing

The approach of the festival had many experiential marketing elements. As a live brand experience it had a central role supplemented by other amplification channels. For example, it had been advertised beforehand in the press. It also attempted to create a lasting impression not only through memories but also by offering every visitor a memorabilia in the form of a wine glass. It did not aim at promoting a particular brand (not even that of the hosting manor, though it of course got a proportionately higher share of mentions), but rather modern high quality fruit wine as a collective phenomenon.

Observation data showed that the live format induced a lot of interaction between visitors and producers giving ample opportunity for conversation

about the wine as well as tasting it. While survey responses show that visitors did not use fruit wine very often (see figure 1), the “big idea” or core message of modern fruit wine being of a high quality and that there are several producers who can provide such pleasurable experiences was successfully conveyed to the visitors, as expressed in conversations between them and the interviewers. Observation data also show that visitors were immersed in the phenomenon of modern fruit wine, being surrounded by multi-sensory stimuli including not only tasting and smelling the wine, but also seeing the wine. For example, one booth had a spectacular method of pouring the wine which involved raising the bottle high above the glass to oxidize the liquid. The sounds of the many wine glasses could also be heard throughout the festival. Furthermore, the interactive format inviting visitors to have discussions with the producers succeeded in not only interaction but also involvement and at least a temporary preoccupation with modern fruit wine in the visitors.

Many came because they had heard of fruit wine or were interested either in fruit wine in particular or gastronomy in general. Others were locals who came mostly to support events in the local community or to socialize with family and friends. Visitors could be roughly split into these two groups, locals interested in a local live experience and non-locals interested in a fruit wine live experience. This can be discerned from survey responses on motives for visiting (see figure 3 below), and observation data showing that many visitors were casually dressed while some had dressed up for the occasion indicates some further evidence of a bisection of visitor groups. The festival worked as experiential marketing for both groups albeit for different reasons. Williams (2001) has demonstrated that over the past decade, there has been a shift in wine country imagery from an emphasis on wine production processes and related facilities to more of an emphasis on aesthetic and experiential values associated with more leisurely recreational and tourist pursuits. These values and the opportunities to socialize appealed to the locals many of whom during survey interviews expressed that their motivation for visiting was to experience the place of fruit wine production and sale as a leisure and tourism destination. For the other group, the enthusiasts and hobby producers, the live brand experience satisfied a different motivation. For example, observation data showed that several hobby producers and enthusiasts spent considerable time observing and discussing details of production processes with the producers.

In some ways the festival needs some further development as experiential marketing. The big idea of using modern fruit wine was only partially conveyed to the visitors. The visitors mostly saw modern fruit wine as an exotic aperitif (92% in the survey) or dessert wine or gift item, and not as something to be consumed as a natural daily beverage or a drink to meals. These visitors were also exposed to fruit wine and thus both awareness and knowledge were

spread. However, observation data and survey results indicated that many visitors expressed a lack of knowledge of how and when fruit wine should be used. They appreciated the festival and expressed that they learned much about fruit wines, and the festival may be assessed as a success as a tourist activity. However, we also observed some lacking elements in promoting fruit wine as a daily consumption phenomenon. For example, there was very little food at the first festival, and therefore the visitors had difficulties in tasting the combination of food and fruit wine and learn which dishes that go well with the different wines (see e.g. Figure 2).

Observation and survey data also indicate that there was still a tendency among visitors to see fruit wine as primarily for desserts (in contrast with the intentions of the producers interviewed). During the debriefing, both interviewers and observers also mentioned that several visitors had expressed dissatisfaction with the lack of availability of fruit wine in conventional supermarkets. So to many guests it was not clear where they could buy the fruit wine when they came home thus this part of the marketing was not successful. Finally, according to observation data, some visitors were also dissatisfied with the price level of the fruit wine, which they found too high. Several visitors hypothesized that the low number of producers was the cause of this, and that as more producers entered the market, prices would fall.

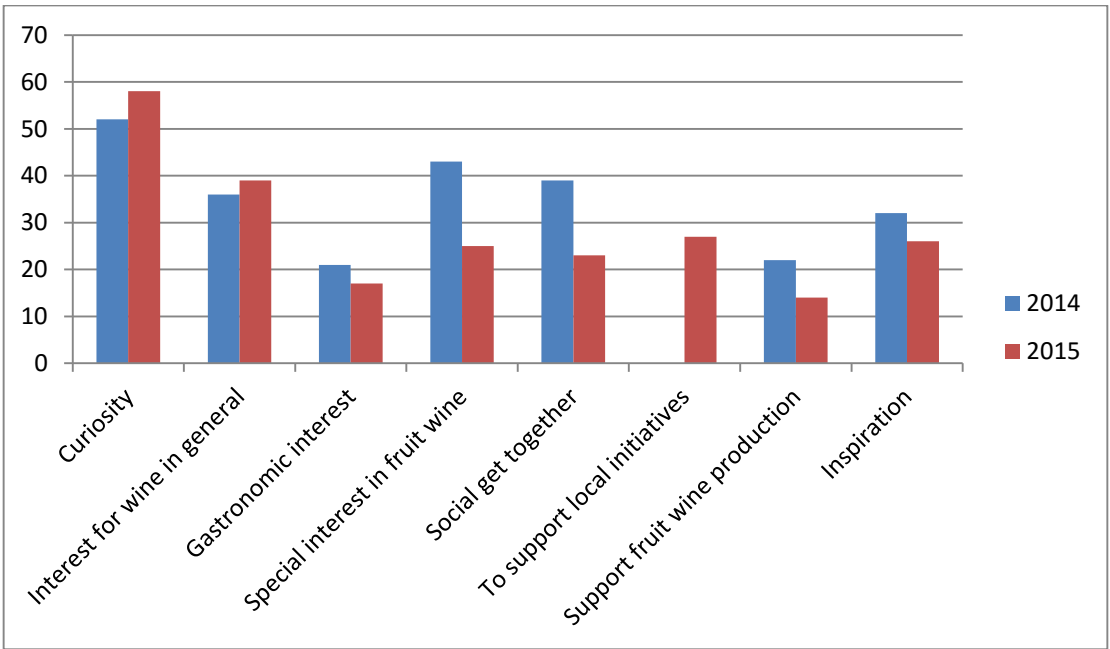
As a live brand experience supported by other marketing channels, the festival succeeded in immersing the visitors and engaging them with modern fruit wine in multi-sensory ways. The core messages of the big idea were also conveyed successfully, but other messages such as use and availability were not communicated successfully to the visitors. Therefore the festival can be seen as a success overall, but with some important elements missing.

5.1.2 Fruit wine festivals and Interest regime

An issue to investigate is whether the visitors are part of a fruit wine Interest Regime (Thévenot 2006) and whether the festival contributes to develop such one. We have asked the visitors in the survey about their motives for coming to the festival (Figure 3) and have investigated this issue in the observations and qualitative conversations. The qualitative material suggests that three different motives as expression of three different Interest Regimes exist. One is an interest in fruit wine. This may be combined with an interest in wine in general and people with this interest are primarily coming from urban areas. This Interest Regime can be seen in figure 3 as “special interest in fruit wine” (43% mentioned this in 2014, 25% in 2015), and the wider interest in wine and use of wine in the categories “interest for wine in general, “gastronomic interest” and “inspiration” (15-30% mentioned these motives); “to support fruit wine production” (22% said in 2014, 14% in 2015) is also part of this Interest Regime.

Another Interest Regime is support of the local community. This is represented by people coming from the festival area (local countryside and towns); they do not care for fruit wine, but want to support local development (production of fruit wine and tourism). This Interest Regime can be seen in figure 3 as “want to support local initiatives” (27% answered this in 2015). A third Interest Regime is a general experience Interest Regime – people are coming for the experience of the festival and social get together, and fruit wine is not a primary interest although it for the occasion can be interesting part of the total experience. This Interest Regime can be seen in figure 3 as “curiosity” (52% answered this in 2014 and 58% in 2015) and “social get together” (39% answered this in 2014, 23% in 2015).

Figure 3 Motives for visiting the fruit wine festivals
Percentage



A part of the visitors are driven by the local community support (or just local curiosity) Interest Regime. This Interest Regime neither increases sales of fruit wine (as these people are not particularly interested in using fruit wine) nor local tourism. As such, the festival is not very successful in its aim. The fruit

wine Interest Regime is a less mentioned motive in 2015 than in 2014 and more visitors never use fruit wine. The festival seems on its way to be counter-productive in increasing the fruit wine Interest Regime. The general experience Interest Regime is the largest motive and it may support local tourism if visitors are coming from far away. The residence of the visitors suggests that this is not case. Less people are coming from Copenhagen in 2015 than in 2014, only 2 people from abroad have been found as interviewees (in 2014) and, although less people come from countryside, more people are coming from towns (which, according to the qualitative material, are mostly locals). The festival does not seem to support an increase of local tourism.

5.1.3 Fruit wine festivals and local wine tourism

As the survey results and observation data indicate at least two different motivation patterns for visitors to attend the festival, this seems to support the results of Nella and Christou (2014) segmenting wine tourists into more and less involved groups, the motivations of the former being wine and wineries and that of the latter being socializing. Both segments belonged to their own Interest Regime which was catered to satisfactorily, indicating that the festival succeeded in offering something for various visitor groups. However, the producers' aim is primarily to promote modern fruit wine and a general fruit wine Interest Regime, not to promote local tourism. Thus the organisers face a decision on whether to target the festival more to the fruit wine Interest Regime or to keep it broad. On the other hand, the fruit wine festival and producer visits may support local tourism as a side-effect. Evidence was also found to support the conclusions of Mason and Paggiaro (2012) that a positive emotional experience, such as that offered at the festival, not only increased satisfaction but also induced visitors to return and to purchase. This can also explain the dissatisfaction that some visitors had that they did not know where to purchase it outside of the festival. As the festival has only existed for three years, it is yet too early to see if it confirms the wine festival life cycle model of Beverland et al. (2001).

5.2 Producer visits

Producer visits are generally not used by the four fruit wine producers. Only one of the producers, who is an extrovert person, has developed quite comprehensive visitor activities. According to interview responses, several tourists visit his growery, but he has discovered that it is difficult to attract normal holiday tourists. The growery is placed in an agricultural area outside normal tourist areas and his wine is not yet so world-famed that many people will make a journey, or maybe not even a detour to visit him. He has been more successful

in using business tourism by organizing seminars and events for firms and their employees and customers, who see the visit as an extraordinary experience.

The other three producers do only receive visitors occasionally. They express in conversations and interviews two reasons for not doing this. One is that the wine growery is a production place and it will be a disturbance to have visitors and they do not have visitor facilities. The other reason is that they do not like to give experiential presentations. One of the three non-visitor-receiving producers – the largest one in whose manor house the fruit wine festival was organized – has planned to develop visitation facilities and introducing organized visits. Particularly via the festival, he has built up ability in storytelling and organizing visits. He is a good story-teller and gives the visitors an extraordinary experience.

6. Conclusion

Festivals and opening for visitors can be means for entrepreneurs within food and wine industries to create awareness of a new product area and do marketing. However, these means also have some challenges: The entrepreneurs should have an extrovert personality to stand for open visiting. Festivals can attract tourists who could be market opinion leaders, but it is difficult to increase sales after the festival (for example because the food and wine product not leave the “exotic” first stage in the consumers mind, or the products cannot be purchased in the visitors normal shops).

This paper contributes with new knowledge to both experience theory (Mossberg 2007; Smilanski 2009; Sundbo and Sørensen 2013), and an emerging food and wine tourism theory (Mitchell and Hall 2006; Hall and Sharples 2008). It shows that the effect of the fruit wine festivals and producer visits on local tourism has been limited. To create a larger effect on local tourism probably demands a wider, permanent and more organized effort that includes many producers who can be visited, several festivals that also appeal to foreign tourists, and fruit wine experiences becoming a part of the general tourism marketing of Denmark. Fruit wine routes could be an example of such an activity. To support the fruit wine Interest Regime, it can be recommended to move the festival to a more urban area where those belonging to this regime live. Or the festival could be expanded with social activities and other initiatives to give it an even higher experience status (similarly to what the Roskilde music festival has done, Sundbo 2004). This could both attract more experience Interest Regime visitors and perhaps make them interested in fruit wine (cf. Sørensen and Sundbo 2014) and attract more fruit wine and other wine enthusiasts.

The festival could increase local tourism, but mostly within a limited timeframe. Producer visits have the potential to increase local tourism to a larger extent, but more experiences would need to be included. For example,

more producers within the same area could give basis for fruit wine routes; consumption of modern high quality fruit wine could also become a more widespread and common phenomenon (including in local restaurants and shops); and it could to a larger extent be incorporated in the overall marketing of local areas.

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C2: Services and issues of sustainability

Chair: Faïz Gallouj

XXV. International RESER Conference:

Service innovation for sustainability: paths for greening through service innovation

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Abstract:

The purpose of this work is to examine the extent to which services and service innovation can contribute to sustainable development in its environmental dimension. The supposed immateriality of services seems to argue in favour of their natural sustainability. This is actually just a myth – one we examine the roots of, and which we refute. This calling into question of the naturally-green-services myth does not, however, mean that the greening of the economy cannot rely on services. On the contrary, greening also fundamentally depends on innovation dynamics being implemented in or by services.

Introduction

More than two decades of research in economics and management science, have helped to make service innovation a relevant, legitimate and increasingly important issue in the field of innovation studies. The (recent) maturity of this field of research is illustrated, to some extent, by the rising number of both qualitative and quantitative literature reviews covering the topic of innovation in services, in both its general and its specific (sectoral or thematic) aspects. A recent review of these reviews is provided in Gallouj and Djellal (2015).

Research efforts have naturally mainly focused on two (often related) issues, namely the nature of innovation in services, and its production modes. Does innovation in services (in terms of form, how it is produced) differ from innovation in goods? This is the main question that has long guided the emerging field of service innovation studies. Depending on how this question is answered, the literature considers three analytical perspectives used to address innovation in services: a technologist/industrialist or assimilationist perspective (negative response to the question), a demarcation/differentiation perspective (positive response) and an integration/synthesis perspective (reconciling goods and services, their differences and similarities, within a single analytical model) (Gallouj 2010). A fourth perspective, labelled inversion perspective, focuses on the strategic role played by certain services (KIBS) in the their customers' innovation.

In recent years, innovation studies have been bolstered, in various ways, through the exploration of new themes (e.g. KIBS in innovation, social innovation, public-private innovation networks, public policies for service innovation, etc.) and through empirical investigation in new sectors. They have also been reinforced by complementary qualitative work using quantitative surveys, relying in particular on the revision of OECD Manuals (Oslo and Frascati Manuals) as well as on the launch of national surveys (see Community Innovation Surveys in particular).

However, the maturity and legitimacy of service innovation studies also depend on their ability to be in line with the great contemporary socio-economic issues. From this point of view, sustainability is undoubtedly a key issue. Contemporary economies are certainly *service economies*, and if they are - or truly aspire to be - *sustainable development economies*, then the question of the relationship between *services* and *sustainable development* has to be addressed. However, in spite of certain notable exceptions - such as reporting on the adverse effects of transport and tourism on the environment - little attention has been paid to this question so far. Sustainability is still seen as a predominantly industrial issue (Djellal and Gallouj, 2010, 2015).

The purpose of this chapter is to examine - mainly from a theoretical angle at this stage - to what extent services and service innovation can contribute to sustainability in its environmental dimension (in other words to 'economic greening') - that is, to the satisfying social needs while leaving the smallest possible ecological footprint. Our focus in this work is thus not (or at least not directly) on the economic and social dimensions of sustainability.

Some intrinsic characteristics of services - especially their immateriality - seem to argue in favour of their natural sustainability. This is actually no more than a myth¹ - and one we propose, in Section 1 of this chapter, to examine the foundations of, achieving its deconstruction. This calling into question of the myth of 'naturally green' services does not mean that the greening of economic activity (at either micro or macro level) cannot rely on services. On the contrary, in section 2 we show that greening also fundamentally depends on innovation dynamics implemented *in or by* services.

1. Services are green by nature: the foundations of a myth, and its deconstruction

The idea that services would be greener and more sustainable, that is, less damaging to the environment than goods, is not uncommon in the literature (Claval, 2006; Illeris, 2007; Rifkin 2000; OECD, 2000; Ellger and Scheiner 1997). It even seems to be confirmed by some statistical analyses at both international and national level. For example, the International Energy Agency (2008) estimated that, in 2005, services (excluding the transport sector) accounted for 12% of CO₂ emissions and 9% of total final energy consumption, worldwide. In the case of France, although the services sector (excluding transport) accounted for almost 75% of GDP and

¹ It should be noted that this is a positive myth, while the service economy is more verbose in negative myths: for a discussion of these myths, see Gallouj (2002)

employment, it was responsible for only 7% of CO₂ emissions in 2008² and consumed 15% of total energy in 2010 (CEREN, 2012).

This idea of the 'natural greenness' of services is based on their immateriality, which is meant to provide a relatively satisfactory criterion with which to distinguish services from goods (§ 1.1). Because they are supposed to be immaterial, services would, the thinking goes, be less harmful to the environment than material goods - whose manufacturing process gobbles up natural resources and is a source of pollutant emissions, etc. The tertiarization processes at work in contemporary economies should therefore automatically lead us to more immaterial/intangible - and therefore more sustainable economies (Ettighoffer 1992; Romm et al., 1999).

This attractive hypothesis is, however, debatable. It is possible, for example, to note that the most tertiarized contemporary economies are also the biggest polluters, and that certain service sectors (transport in all its forms, for example) are among the top sources of negative environmental externalities. Beyond simple fact, our purpose is to reconsider the myth of immaterial and therefore green services, from an analytical angle. Step 1 in this reconsideration process is an attempt to identify a certain number of (forgotten or neglected) sources of service materiality (from a static point of view) (§ 1.2). Step 2 is the highlighting of the socially-constructed (and therefore changing) nature of service materiality/immateriality, depending on the output convention adopted (§ 1.3) and Step 3 consideration of the search for materiality as the subject of active strategies carried out by service organizations (§ 1.4). Inverse dematerialization strategies will be considered in the second section of this work, which is exclusively devoted to them.

1.1. The foundations of the green services myth

Across the board, from economics to management science, works on services ritually recall a list of technical characteristics that are supposed to be intrinsic to services, namely: Intangibility (immateriality), Heterogeneity, Interactivity and Perishability. This is particularly true in marketing, where the IHIP acronym is common knowledge. These characteristics have long been considered quasi-genetic criteria (a kind of DNA) serving to distinguish services from goods.

This definition of the essence of services by their immateriality is rooted in the history of economic thought, particularly among classical economists (Smith, 1960 [1776]; Say, 1972 [1803])³.

He does not explicitly use the term 'immaterial', yet Adam Smith is considered the precursor of the definition of services by their immateriality. This intrinsic technical characteristic of services comes from the distinction Smith made between 'productive' and 'unproductive' labour. Only productive labour (for example, the labour of the workman in a factory) creates wealth, because it adds value to the material it processes and it brings about material results, which are likely to lead to

² Data from CITEPA: Centre Interprofessionnel Technique d'Etudes de la Pollution Atmosphérique [interprofessional technical center for the study of atmospheric pollution] concerning CO₂ emissions, excluding LULUCF (Land Use, Land-Use Change and Forestry).

³ For a review of the debates on services in economic thought, see Delaunay and Gadrey (1992).

accumulation. In contrast, services⁴ are performed by unproductive labour, that is to say, which “does not fix or realize itself in any permanent subject, or vendible commodity, which endures after that labour is past, or for which an equal quantity of labour could afterwards be procured” (Smith, 1960 [1776]). The immaterial nature of services is often derived (in a way that is perhaps somewhat unsatisfactory) from the idea formulated by Smith (and taken up by Alfred Marshall) that the “work of all [the services] perishes in the very instant of its production” (ibid.). Admittedly with some ambiguity, then, the unproductivity of service work (its inability to create wealth) is, in Smith’s words, a synonym for immateriality.

It was another classical economist, Jean-Baptiste Say (1972 [1803]), who first explicitly introduced the ‘immaterial’ qualifier to the definition of services. Jean-Baptiste Say called into question the implicit and ambiguous identity established between *unproductivity* and *immateriality* (*the evanescent nature of the output*). According to him, services, while immaterial, are not unproductive, since they are useful, the source of visible and enduring (accumulative) results (changes) - for example the healing produced by the work of doctors. In Smith’s analysis, Gadrey (2000) identifies the premises of a distinction between immediate or direct output on the one hand, and the mediate output on the other - the outcome or long-term or indirect result (‘change of state’ in the reality subjected to the services provided). Only the immediate output is evanescent, the outcome itself is lasting: for example health, education and culture have durable effects on the mind or body. To take another example provided by Smith himself, though the immediate work of the domestic servant may be evanescent, the resulting cleanliness does not vanish once the work is done, but endures some time.

The reasoning which, in modern economies, involves translating this genotype (that is, these technical characteristics) into an environmentally-friendly phenotype is obvious. Since the output of services is immaterial, evanescent and transient, it is supposed not to harm the natural world, unlike industrial and agricultural production which transforms raw materials into physical goods, damaging the environment in both their production and their consumption. Such reasoning is clearly mistaken. Services are both less immaterial, and less green than they seem – it all depends on how the materiality issue is addressed. Services are of course immaterial in the sense that they are not intended to produce tangible goods as final output. However, their relationships with materiality may take a range of forms, in line with the types of services envisaged. In the following paragraphs, we examine these different relationships.

1.2. The (neglected) sources of service materiality

Given the link established between the level of materiality and the sustainability of services, in calling into question the principle of intrinsic immateriality of services (genotype), we also query its supposed positive effects in terms of sustainability (phenotype). We therefore propose, in this paragraph, to seek to identify neglected sources of service materiality which undermine the myth of its natural sustainability.

⁴ Smith provides a number of examples of service providers including domestic servants, servants of the state, servants of the church, artists, lawyers, doctors...

Service materiality may manifest itself in different places: (a) in the service medium or target; (b) in various estate facilities, that is the physical spaces of production/consumption; (c) in the production factors deployed in the service relationship. While it is important not to neglect the (physiological) materiality of the human factor, it is of course on the capital factor that we focus here. A further significant source of (direct and indirect) materiality stems from another intrinsic characteristic attributed to the service - its interactivity, its coproduced character (d). Indeed, interactivity is often associated with mobility, which requires implementation of a certain number of transport facilities and infrastructure – these being highly material and damaging to the environment.

a) Materiality of the service medium

The diversity of services in their relationship to materiality is obvious. Even intuitively, it escapes no-one that transportation, waste processing, cleaning, catering, hostelry, and car repairs are more 'material' services than are consultancy, training, insurance or psychotherapy. Even within the confines of these few examples alone, we might add that nothing is more material than the dishes prepared in a restaurant's kitchen, whereas psychotherapy is primarily a verbal exchange.

Beyond plain intuition, by mobilizing theoretical works devoted to definition of the service concept (Hill, 1977; Gadrey, 2000), this difference in materiality between services can be interpreted by the difference in materiality between their mediums. Indeed, drawing on Hill, Gadrey (2000) defines the service as a "set of processing operations seeking to change the state of the service medium". The service medium is in turn defined by the target or reality modified or worked upon by the service provider on the customer's behalf. It may take different, more or less material forms: (i) a material good, (ii) codified information, (iii) individuals (customers, users) themselves having physical, intellectual or locational characteristics, and iv) organizations, again in their various aspects (technologies, structures, collective competences and knowledge).

The 'change of state' effected by the service can be considered immaterial (healing for the sick, satiety for the guest of a restaurant, repairs to a car, improved cultural awareness, knowledge and employability for a student). Such a change of state can neither be stored nor surrendered, regardless of the medium to which it is consubstantially linked. The service medium may, however, be more or less material, leading to the service itself in turn being considered more or less material.

The degree of materiality of the medium is the basis for a number of service typologies. Thus – when focusing on the difficulty of defining and measuring productivity in services – Gadrey (1996) has proposed a typology which can be extrapolated without difficulty to the services sustainability issue. This typology includes three groups of services whose differences are marked by their main medium:

- 1) Services that mainly involve the physical processing of technical mediums. These differ little from the conventional production of physical goods, which is the category to which the statistical conventions would in any case have assigned them (passenger and goods transportation, repair of goods, catering, hostelry, retailing,

various rentals, standardized processing of codified information (e.g. some functions of banks and insurance companies...).

2) Intellectual services applied to organized productive knowledge - often referred to as 'intangible' or 'pure' services because, unlike those of the previous group, these services are not primarily focused on goods (engineering, consultancy services, R&D, software production, advertising/PR services, etc.).

3) Services applied to individuals' knowledge and capabilities, in final consumption, and posing significant problems with regard to the identification and measurement of output (education, health, leisure, culture, etc.).

In the previous typology, the service is defined by the *main* medium that is the subject of the 'state change process'. This means that in reality every service activity operates, to varying degrees, on *several mediums*, so that every service activity is in fact a combination of functions associated with these different mediums (material, informational, cognitive, relational, etc.). These combinations vary across space, and especially over time (we will return to this issue in point 2.1a).

b) The materiality of service production/consumption spaces

Another key expression in the materiality of services is the materiality of their production/consumption spaces. The service economy is often associated with the absence of factories and heavy-duty production lines. However, services do also require production/consumption spaces such as offices, classrooms, hospitals, railway stations, and airports. It would clearly be wrong to conclude that these spaces are environmentally benign – one has only to consider the space taken up by such service facilities as supermarkets, airports, logistics platforms, university campuses, hospitals, landfills, etc. The environmental damage attributable to these production/consumption spaces manifests itself in a variety of ways: use of space, energy consumption, waste generation, emissions, noise, visual and olfactory disturbances, etc.

From an organizational perspective, the question of the production space materiality is often considered via making a distinction between two different spaces: the back office and the front office. The back office is where the material or informational transformations of service mediums take place in the absence of the customer (for example, the restaurant kitchen or the various departments within a company). The front office is the customer-facing area (for example, the floor of a restaurant, the bank counter or the hotel lobby).

In management science, and in marketing in particular, an extensive literature has developed in recent years, seeking to take full advantage of these production/consumption spaces and enhance their materiality. This aspect of materialization strategies will be discussed in paragraph 1.4.

c) Materiality of the production factors deployed

Even though the labour factor has an evident physical existence, here we are addressing the issue of capital materiality. The third sector theory is built upon the idea that services are low capital-intensive, and primarily based on the mobilization of

labour. Colin Clark, a founding father of the theory of the third sector, observes that “most service businesses require far less in the way of capital goods than industry or agriculture” (Clark, 1940). This low capital- intensity lies at the heart of the first positive (rather than residual) definition of the tertiary sector. According to Fourastié (1949), the service sector includes activities for which productivity growth rate is low due to weak mechanization. Baumol (1967) relies on the same assumption in his unbalanced growth model which defines services as a stagnant sector, whereas goods belong to a progressive sector. It should however be noted that in a later work, Baumol et al. (1985) qualified this analysis by introducing an asymptotically stagnant sector combining a progressive and a stagnant component. An example of this is provided by the IT sector, whose hybrid nature (hardware + software), starts out progressive, while the hardware element is proportionately dominant, then evolves towards stagnation as the software component grows stronger.

This negative assessment of the capital-intensity (and materiality) of the services (and conversely, the positive assessment of their sustainability) must be qualified and called into question - both statically and dynamically. First of all, it is undeniably true that some services have long been characterized by their high capital-intensity: this is the case not only of transport in all its forms (passenger and goods transport, air, rail, land and sea transport, etc.), but also of energy and water supply activities (public utilities) for which the question of their belonging to ‘industry’ or ‘services’ continues to be a matter of debate (Broussole, 2014). Yet it is clear, from a dynamic perspective, that services are increasingly capital-intensive. They fall within the scope of natural technological trajectories in the sense of the evolutionary theory (Nelson and Winter, 1982), i.e. trajectories of increasing mechanization. We will return to this point in paragraph 1.4.

d) The material dimensions of interactivity

Interactivity is another essential (intrinsic) technical characteristic of services. It refers to the different forms of interaction between service consumer and service producer (different modalities of the service relationship), which reflect various levels of co-production of the service by the consumer. Like immateriality, this technical characteristic of services also has its roots in the history of economic thought. Storch (1823) is often cited as its precursor.

This service interactivity is also a source of materiality - and therefore of adverse effects to the environment. It often presupposes a physical encounter, which entails travelling on the part of service relationship protagonists. These journeys are material-intensive because they mobilize not only transport infrastructure and technical systems, but also different encounter venues, depending on the nature of the mobility in question. Interactivity thus has an effect on materiality, especially through the two above-mentioned vectors of materiality (see § b and c) - namely the factors of production and production/consumption spaces.

Several types of journeys can be distinguished (Gadrey, 2010; Fourcroy et al., 2015): (i) journeys by consumers or users to the place of service production/consumption (for example, in trade, catering, hostelry, education or health, at least in their traditional dominant form); (ii) journeys by service providers to the customer, be this a firm or a end consumer (e.g., consultancy, certain sales formulas, home services);

(iii) simultaneous journeys by service providers and clients (passenger transportation in all its forms); (iv) journeys made by service organization employees to their workplace.

These different types of journeys involve individuals whose mobility is required for the establishment of the service relationship, that is the encounter between client and provider. The mobility can however also concern material goods: material inputs required to produce the service, as well as the goods that are the subject of the service transaction (e.g. supply to stores in retailing, delivery of goods to customers in mail-order selling).

Service-associated journeys are a major source of energy consumption. In 2007, in France, they represent approximately 40% of official tertiary sector energy consumption (Fourcroy et al., 2012). The scale of these journeys and their impact on sustainability are such that Gadrey (2010) has no hesitation in predicting the decline - and even the demise - of whole swathes of the tertiary sector, unless appropriate solutions (innovations) are found. Examples of such activities are transportation and all services relying heavily on transportation - including international tourism and business travel, hostelry, postal services, etc.

1.3 A materiality/immateriality that depends on the output convention adopted

Immateriality is not an (objective) intrinsic technical characteristic of services, just as materiality is not anymore always seen as a fundamental dimension of goods (see § 2.2). The degree of materiality is a social construction, which depends on the output conventions adopted. The materiality of the service and its impact on the environment differs, depending on the delineation of the border of the service, according to its topographical and temporal coordinates.

In the following paragraphs, we consider the output convention at three different levels:

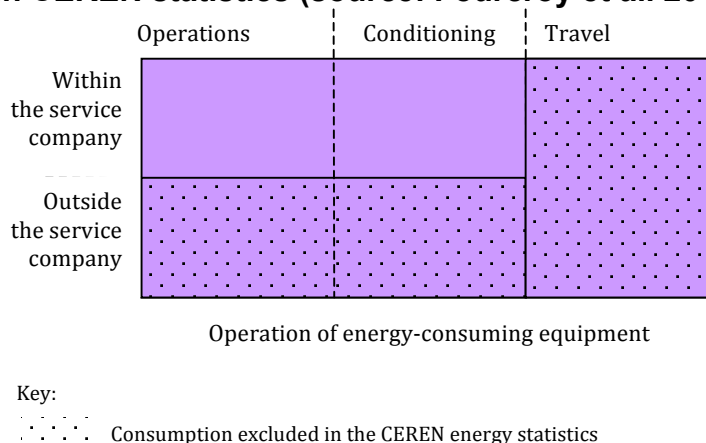
- the technical (topographic) delimitation of the boundaries of the service activity as such (this level essentially reflects the direct materiality of the service);
- the focus on the indirect dimensions of the materiality of the service, particularly (but not exclusively) from a time perspective, involving an analysis in terms of life cycle;
- the focus on the universal nature of the "service provided" as an ontological characteristic of both services and goods.

a) The physical scope of the service

It is obvious that, depending on the border that is drawn to delimitate the service, the level of its materiality and therefore of its sustainability can vary considerably. This relationship between the output convention adopted and sustainability can be illustrated in the case of the evaluation of energy consumption. Such an exercise was performed by Fourcroy et al. (2012), who propose to break down the service into three components (basic services), which give rise to different energy needs (see Figure 1): conditioning, service operations and travel.

According to the definitions of the service previously mentioned (§ 1.2a), *service operations* consist in the mobilization of competences and techniques in order to make transformations on the various mediums of the service (material object, information, knowledge, the individual). These operations require technologies, particularly technologies for material and information processing, which are energy consuming. *Conditioning* refers to the whole set of energy-consuming activities achieved for the preparation of the physical space of the service activity (fitting out, cleaning, heating, air conditioning, lighting, etc.). These activities take place upstream of the service operations, but also during the operations and partly after them. *Travel* refers of course to the different configurations of the journeys made by the service protagonists before, during or after the service operations (see section 1.2d). It is a major source of energy consumption and pollution. It should be noted that conditioning activities and service operations could take place in the premises of the company or outside the company.

Figure 1. The Scope of Energy Consumption in the tertiary sector as assumed in CEREN statistics (source: Fourcroy et al. 2012)



However, the official energy statistics (for example, in France those of CEREN⁵) limit the scope of energy consumption to *conditioning activities* and *service operations within the service firm*. The only energy consumption taken into account are those of the equipment used within the premises of the service organizations. Therefore, the measurement conventions underestimate the energy consumption and more generally the negative environmental externalities in the tertiary sector. They exclude, in fact, on the one hand, the energy consumption of conditioning activities and of service operations performed outside the service firm, and on the other hand, the consumption related to travel activities.

By adding to the official statistics, the energy consumption generated by the whole set of journeys related to the consumption or production of services (journeys the service consumers in order to consume the service, journeys by service organizations employees from home to their workplace, journeys by service providers for professional reasons), Fourcroy et al. (2012) estimate, in the case of France, and for 2007, that the energy consumption is multiplied by a factor of 1.4.

⁵ CEREN: Centre d'Etude et de Recherches Economiques sur l'Energie [Centre for study and research into energy economics]. This is the major French organization supplying energy statistics on the tertiary sector.

b) The direct and indirect sources of materiality

The discussion of the materiality of services (and of its negative effects in terms of sustainability) is often restricted to its *direct* sources. But there are also *indirect* sources of materiality. Taking them into consideration would contribute to scale up the adverse environmental effects of services.

Direct sources of materiality (and corresponding negative externalities) are those which appear immediately within a given service provision. They reflect the negative externalities directly generated by the use of the different material elements (service medium, production factors, production/consumption spaces, etc.), within the different component of a service (operations, conditioning, travels).

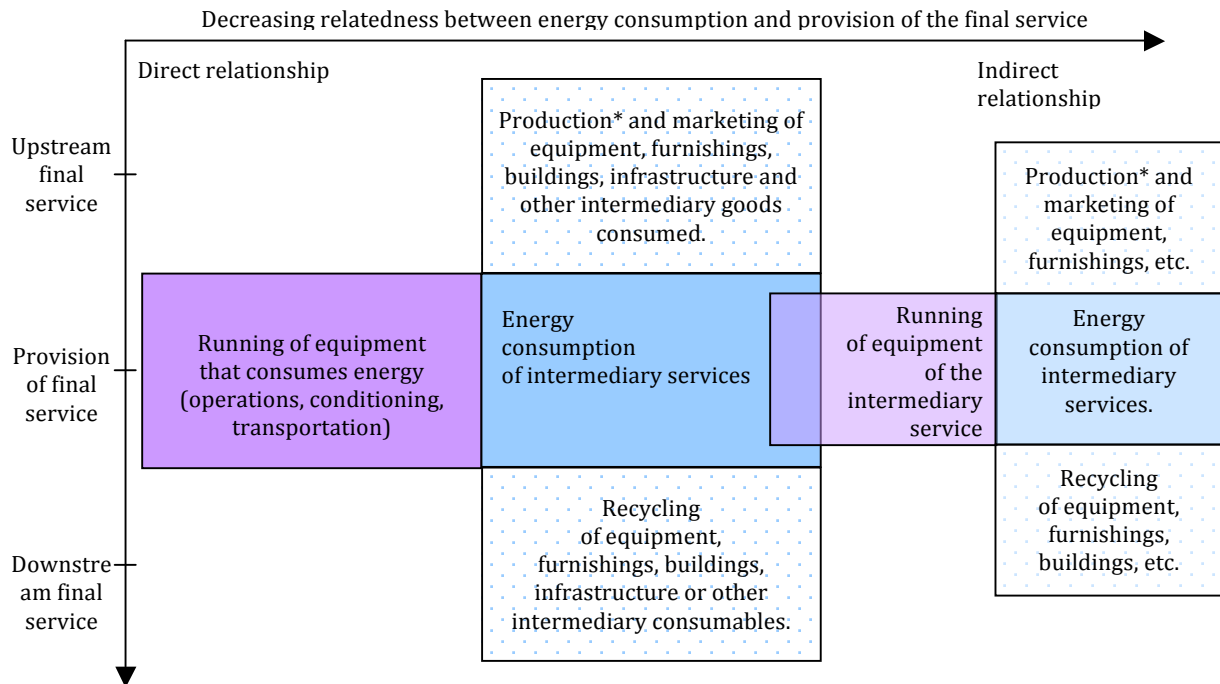
Indirect sources of materiality, for their part, are those that are induced by the service in question in the rest of the economy and/or at other times, upstream or downstream the service. There are (at least) two different types of indirect sources of materiality (Fourcroy et al., 2012).


The first type can be addressed by an analysis in terms of life cycle, applicable to the whole set of material goods mobilized during the service provision: technical equipment of course, but also buildings, furnishings, intermediate consumption of various goods, goods sold (e.g. in retailing). These different material goods are not only sources of materiality (and externalities) during their use (direct materiality previously mentioned), but also, upstream, at the moment of their own design, production and selling, and downstream, when they are maintained or repaired and possibly recycled at the end of their life. By analogy with grey energy, this incorporated materiality can be labelled "grey materiality".

The second type of indirect source of materiality of the service corresponds to the materiality associated with the different types of intermediary services, necessary for the provision of the final service in question. These may include, for example, cleaning services, catering services, consultancy services. These intermediary services also, recursively, involve direct and indirect sources of materiality. The former correspond to the negative externalities that appear immediately during the delivery of the intermediary services in question and which are generated by the different vectors of materiality of these intermediary services (equipment, furnishings, buildings, etc.). The latter correspond to the grey materiality of these intermediary services themselves and, recursively, to the materiality of the intermediate services necessary for the provision of these intermediate services themselves, etc.

Figure 2 provides an illustration of the distinction between direct and indirect sources of materiality, in the sole case of energy consumption. It can easily be generalized to all direct and indirect sources of materiality. Using an input-output method, Fourcroy et al. (2015) estimate that in France, for 2009, taking into account grey energy multiplies the energy consumption in services by a factor of 1.6 (it is even doubled in certain service sectors such as the information and communications sector).

Figure 2 The total direct and indirect sources of energy consumption in a final service



 Grey energy of equipment, furniture & furnishings, buildings, infrastructure, etc.

*Production in the broad sense. This includes: the design of the project, the extraction and transportation of the necessary raw materials, the processing of raw materials and fabrication of the product.

c) The service as a common ontological characteristic of both goods and services

The idea of the subjective and conventional nature of the border of services (of the difference between goods and services) probably culminates in the recent theoretical work, which consider that the search for specificity (materiality of goods vs. immateriality of services) is counter-productive, since in fact "everything is service".

These works share the idea of a certain (observed or desired) blurring of the boundaries between goods and services and the need for common theoretical models. They actually rediscover the principles of consumer microeconomics: the utility, the value in use, the service or final characteristic as an ontological characteristic of both goods and services. This common immaterial nature of goods and services, which militates in favour of integrative or unifying theoretical analyses, is at the heart of all the following theoretical constructs: the functional economy theory (Stahel, 1997; Du Tertre, 2007; Boutillier et al. 2014), which defines any output (goods or services) by the function (service) it provides, the experience economy theory (Pine and Gilmore, 1999), which defines the output by the experience it provides to the consumer, the "Service-Dominant Logic" (SDL) (Vargo and Lusch, 2006) which defines the value by the value in use, therefore erasing the difference between goods and services, and the "Service science" (Maglio and Spohrer, 2008) which is a science of both goods and services. Another formulation of this integrative theoretical perspective is more directly focused on the innovation issue. This is the approach (of the product and of innovation) in terms of

characteristics developed by Gallouj and Weinstein (1997) and extended by a number of other works (De Vries, 2006; Garcia-Goñi and Windrum 2008; Gallouj and Toivonen, 2011, etc.).

However, if they share a common desire of theoretical synthesis, these integrative theories do not pursue the same key objectives. Thus, the main initial project of the functional economy theory (Stahel, 1997) is to develop a theory of sustainable development. Therefore environmental issues occupy a central place in this theory. The analysis in terms of SDL (Vargo and Lusch, 2006) and the experience economy theory (Pine and Gilmore, 1999) essentially fall into the scope of a perspective of service marketing. They rediscover and operationalize the use value, and the new consumer economics (Lancaster). The approach in terms of characteristics (Gallouj and Weinstein, 1997) is also of Lancasterian inspiration. Its main purpose is to provide a theoretical model that accounts for the diversity of the innovation dynamics in both services and goods. But of course, these theories can add (or have already added) to their research agenda, purposes other than their original purpose. Thus, for example the functional economy theory and SDL are increasingly addressing innovation issues (Ordanini and Parasuraman, 2011; Vargo et al., 2014). The approach in terms of service characteristics strives to integrate environmental and more generally sustainability issues (Djellal Gallouj, 2015; Cruz et al, 2015).

1.4 The rise in materiality as an active strategy of service organizations

In management sciences, real or supposed immateriality of services has long been regarded as a weakness to be corrected. This immateriality of the service and its associated heterogeneity/variability character, are the origin of performance evaluation issues (service quality, cost or labour productivity) concerning both the client and the service provider (Gadrey 1996; Djellal and Gallouj 2008a). Therefore different (innovation) strategies have been implemented to introduce material elements in services or optimize existing ones. Some authors (especially Levitt, 1972) established this rise in materiality as a strategic imperative for service organizations, advocating for a systematic "industrialization" of services.

The increase in material intensity of services and their industrialization can take different forms that are closely related, but that we present separately, in order to highlight the different materialization (and industrialization) mechanisms at work.

The first form of materiality rise is the introduction of material technical systems in service companies and organizations. The information and communications technologies that spread invasively in services are (especially in their hardware dimension) an essential source of this materialization process. But other technologies also play a key role (often by hybridization with ICTs): cooking, cooling and ventilation technologies, transportation technologies, medical technologies, etc. As highlighted by a certain number of works (Berkhout and Hertin 2001; Faucheux et al., 2002; Gadrey, 2010), these technical systems are intensive consumers of exhaustible natural resources (rare metals) and energy. They also raise formidable problems related to the treatment of waste. Their development is often artificially supported by extremely short life cycles associated with quasi-programmed obsolescence (Desmarchelier et al., 2011).

The second form of materiality rise is, paradoxically, the implementation of what may be called soft or "immaterial" technologies. This is the standardization of work processes, the implementation of industrial production methods, models, blueprints (Levitt, 1972; Lovelock, 1992; Kingman-Brundage, 1992), which are veritable production "manuals" of the service. These invisible technologies lead to a standardization of the service itself. The product, in this case, is not a good, but a quasi-product: for example, a standard insurance contract or a standard financial product, a tourist standard package, a standard menu item identical throughout a fast food chain (McDonald's is often cited as the archetype of the industrialization of catering). Industrialization means, then, eliminating cases that are not standard cases.

The third form of materiality rise involves the physical spaces of production/consumption of the service. It can be addressed in two different ways. The first reflects the development, in possibly innovative forms of these spaces defined as architectural entities (*external or 'property' materiality*). The icons of this property materiality are large shopping centres, logistics platforms, transportation hubs, etc. It should be noted that this property materiality can even, in certain cases, rely on industrial production processes, since some modules of the building infrastructure are pre-fabricated in a factory (this is the case, for example, of Hotel Formule 1 of Accor Group). The second way to address the rise of materiality of the physical spaces is to look at the materiality that manifests itself within the infrastructures. This *internal materiality* is critical to customers, who are sensitive to the aesthetic and functional qualities of the internal architecture and of the furnishings: accessibility to spaces, signage, appearance, decor, comfort, ergonomics, etc. All these elements contribute to make tangible the immaterial and the heterogeneous, and are the subject of intense innovation efforts. The strategies implemented to optimize the internal materiality may have different but complementary goals: communication/advertising, improving access and mobility, optimizing the client-provider interaction, reducing uncertainty about the quality, etc.

The last form of materiality rise that we evoke does not concern the production but the consumption sphere. It manifests itself by the rise of the self-service in Gershuny's meaning (1978), that is to say the replacement of services by industrial goods used at home: for example, the replacement of the laundry service by the use of one's own washing machine, the replacement of the cinema by the DVD at home, etc.

2. Greening the economy by innovation *in* services and *by* services

In the first part of this work, we have argued that, contrary to an old assumption, the service is not green and sustainable by nature, but that it includes direct and indirect sources of materiality, which serve to increase its ecological footprint. We have raised the innovation issue only in addressing these sources of materiality in dynamic terms, that is to say by focusing on the materialization/industrialization strategies implemented in service companies and organizations.

In this second part, we address innovation from a different angle, that of dematerialization strategies. In a service economy, innovation in services and by services plays a key role in the process of dematerialization and greening. This greening of the economy by services and service innovation can take two different but complementary paths: first, the greening of the services themselves through the implementation of dematerialization strategies and green innovations trajectories within services sectors (§ 2.1); then, the greening of goods by services and services innovation (§ 2.2).

2.1 The greening of services themselves: the green innovation trajectories in services

We consider here how, through appropriate innovations strategies, services can dematerialize and green themselves. To account for these *internal or endogenous dematerialization* strategies, we rely on the different dimensions of the materiality of the service previously considered, namely the materiality of (i) the service medium, (ii) the production/consumption spaces and (iii) the production factors. We will not discuss here separately dematerialization strategies associated with the interactivity of the service, to the extent that they are actually special cases of dematerialization strategies related to production factors (transport systems) and production and encounter spaces. This analytical approach is simplifying since the different materiality sources separately addressed here are interdependent in reality.

a) Dematerialization and greening of the service medium

As we mentioned in paragraph 1.2, the medium of the service can take different more or less material forms: a (material) good, the individual himself, codified information, knowledge. If, in theory, a service activity may be defined by the nature of its main medium (therefore several types of services are distinguished: material, informational, cognitive, relational services...), a service organization is mostly processing simultaneously these various mediums, combined in varying proportions. These combinations are not static but dynamic, and in particular, they may evolve according to dematerialization trajectories.

Depending of the analytical level adopted (macro, meso, micro), the dematerialization of services, considered in terms of the dematerialization of their mediums, can be interpreted in different ways.

At the macro or mesoeconomic level, the dematerialization of the medium may manifest itself by a rise of informational, cognitive and relational services at the expense of material services. This structural change is reflected by concepts such as 'information economy' or 'knowledge economy'. It is also at the heart of the post-industrial society as defined by Daniel Bell (1973), namely, a society that is moving towards the higher-level services in which the mediums of service provision are human beings and knowledge (in particular health, culture, leisure, research and public administration) to the detriment of so-called lower-level services characterized by the processing of tangible goods (transport, retailing, etc.).

At the micro level, this dematerialization is expressed by the rise, within a given organization (or activity), of processing operations of immaterial mediums

(information, knowledge and relationship with the individual) to the detriment of processing operations of physical mediums. The outsourcing of certain material services activities (e.g., catering, transportation, cleaning) can contribute to this process of dematerialization. However, as highlighted by Djellal and Gallouj (2008b), the various mediums of the service and the various corresponding functions (operations) can be associated with different technology families: material processing technologies (robotics, mechanics,...), information processing technologies (IT, telecommunications), knowledge processing technologies (soft technologies, methods...). Thus, in a given activity (or service organization), the rise of the immaterial mediums and functions with respect to material mediums and functions is bound by a reciprocal causality to the change of relative weights of technological families and corresponding innovations trajectories. The dematerialization of the service is thus associated with the rise of immaterial innovation trajectories (pure service, cognitive (methodological) and informational (in its software dimension) at the expense of material innovation trajectories (see section c).

b) Dematerialization and greening of production/consumption spaces

The dematerialization and greening process of production/consumption spaces fall into the scope of two distinct groups, which are not fully independent. The first group includes the different operating modalities of the dematerialization and greening of traditional production/consumption spaces, while the second group consists of "alternative spaces" to these traditional spaces.

In the first group, dematerialization and greening of the traditional production/consumption spaces can be operated in different ways, which, essentially, refer to building engineering and architecture (including interior architecture). Thus dematerialization and greening cover, first of all, innovation efforts to build sustainable property infrastructure (ecoconstruction, HQE approach) whether these efforts focus on the nature of the materials used, the non-intrusive inclusion of infrastructure (the buildings) in the natural environment or the configuration of interior spaces, etc. They also cover, in some respects⁶, "architectural and spatial" facets of the so-called low-cost or service regression strategies (Djellal and Gallouj, 2005, 2008b). Indeed, these service regression strategies simplify not only the service offer (by limiting it to the central service and eliminating peripheral services), but also the physical environment of this offer. They are less demanding in volume and quality of reception areas (see, for example, the frugal reception areas of low-cost airlines companies at airports, the Spartan material organization of shelf spaces in discount retail chains) and, according to Fourcroy (2015), less energy consuming. Dematerialization and greening of traditional production/consumption spaces finally also covers the experience of "smart buildings", reflecting a hybridization of real estate techniques and information technologies (see following item c).

In the second group, dematerialization and greening of production/consumption spaces are obtained by the introduction of spaces, alternative to traditional production/consumption spaces. Some of these alternative spaces are not new, but

⁶ In other respects, and primarily, regression strategies aim more, as we have already stated (see § 1.4) to industrialize the service, to make it less intangible, less interactive.

they are experiencing a significant development. These include, for example, alternative spaces associated with the following services: 1) home services (e.g., home care services, especially elderly care); 2) remote services relying on post mail, telephone, but especially Internet; 3) services in shared space (e.g. village shop that provides postal services). These alternative spaces can contribute, in varying proportions, and all things being equal, not only to reduce the production/consumption spaces but also the amount of travel.

c) Dematerialization and greening of the production factors

The process of dematerialization/greening production factors (limited here to technical systems) can be addressed by focusing on the different ways that innovation trajectories at work in service organizations may evolve: (i) the rise of immaterial innovation trajectories at the expense of material trajectories; (ii) the strengthening of the immaterial dimension within a given innovation trajectory; (iii) the hybridization of several trajectories. The process of the dematerialization of production factors can also be addressed (iv) through changes in material goods ownership and use regimes.

Changing relative weight of innovation trajectories in favour of immaterial trajectories

First, within a given service company or service activity, the dematerialization/greening process can be considered (as we have already pointed out above) to be a rise in immaterial innovations and technologies at the expense of material innovations and technologies, alongside the rise of the intangible components of the service provision, which is at the expense of its tangible components. In other words, material innovation trajectories reflecting technological developments relating to the transport and transformation of material substances, whether human or physical⁷, become less important than immaterial innovation trajectories which reflect, on the one hand, the production and evolution of formalized methods of knowledge processing⁸ and, on the other, the implementation and evolution of 'pure' services innovation, independent of any technical medium.

Strengthening of the immaterial/green dimension within a single innovation trajectory

The dematerialization process may also be considered at the level of any one component of the service (material, informational, cognitive, or relational) or at the level of the corresponding innovation trajectory, whether material or immaterial. The idea here is that the innovation trajectories, whatever form they take (material or immaterial), are becoming more environmentally-friendly, meaning that efforts are being made to develop and adopt cleaner, more energy-efficient technologies. For example, within the logistics material innovation trajectory, efforts are made in favour of cleaner transport technologies (electric and hybrid vehicles). Within the material and information innovation trajectories, efforts are also made to reduce the volume (materiality) of new technical systems, so that they are more compact. This trend towards miniaturization and integration is not, however, new. Though evolutionary economics (Foray and Zuscovitch, 1988) has described it as a specific natural technological trajectory insofar as it characterizes the technological evolution of a particular sector (electronics), it is tending to become a generic natural technological

⁷ For example, passenger or goods transportation systems, cooking and refrigeration systems, cleaning systems, various kinds of dispensing machines, visitor attractions, bio-medical or bio-pharmacological innovations, etc.

⁸ For example, new consultancy methodologies, new health or cleaning protocols.

trajectory (concerning many sectors). In the specific case of the informational trajectory describing the dynamics of information systems, it is generally assumed that (immaterial) 'software' dimensions tend to outweigh the (material) 'hardware' dimensions as the trajectory evolves. Acceptance of this hypothesis thus means that the informational trajectory will evolve in line with a growing dematerialization process. It is on the basis of this hypothesis that Baumol et al. (1985) introduced an asymptotically stagnant sector in the so-called unbalanced growth model.

Hybridization of material and immaterial innovation trajectories

Dematerialization and greening can also happen through the hybridization of innovation trajectories. In the most common case - the hybridization of material and informational innovation trajectories - the question arises as to whether hybridization helps reduce the level of materiality of the new hybrid technical systems formed (to which the answer is probably yes, assuming that the software dimension overrides the hardware dimension). However, beyond this hypothetical dematerialization, there is no doubt that some hybridization strategies, all other things being equal, do have a greening effect: this is the case where the introduction of ICTs helps streamline use of a technical system with a view to sustainability -and in particular to energy-saving (smart grid solutions) (Hyytinen and Toivonen, 2015). This is also the case where ICTs are used to carry out service transaction without travel (e.g. remote surgery). Conversely, it should be noted that the hybridization of immaterial (pure service and methodological) innovation trajectories and informational innovation trajectories – that is, the introduction of ICTs to both pure service and methodological innovations, contributes to the pro-materialization dynamic in services (see § 1.4).

Changes in production factor ownership and use regimes

Dematerialization of production factors (and more generally of material goods) may be achieved through changes in ownership and use regimes. Within the sphere of production, as in that of consumption, individual ownership and private use may give way to different service consumption patterns that do not include ownership (or do not include exclusive ownership) of the goods: leasing, renting, sharing, pooling (see also § 2.2c below). Examples include car sharing (such as BlaBlaCar), shared use of certain sophisticated and expensive technologies, possibly within the context of public-private partnerships (e.g. scanners in hospitals), etc. This fall in materiality, voluntary though it may be, can also be fortuitous, a joint by-product of the pursuit of other objectives. This is, for example, the case of the pooling of heavy equipment in hospitals, which primarily pursues an economic objective.

2.2 Dematerialization/greening of goods (and of the whole economy) through services

As we noted in the previous paragraph, services (as activities or organizations) may themselves be subject to dematerialization and greening dynamics. Here we look at another relationship between services and greening, namely the potential role these activities may play in the greening of other economic activities than their own. These greening (dematerialization) strategies can be described as *external or exogenous*. Within the framework of the so-called economy of functionality, and within a servitization perspective (Vandermerwe and Rada, 1988), the concept of Product-Service System (PSS) (for a literature survey, see Goedkoop et al., 1999; Mount, 2002; Tischner et al., 2002; Tukker, 2004; Baines et al., 2007; Beuren et al., 2013)

occupies an important place in this issue of the greening *by (rather than of) services*. Although it is becoming catch-all and ambiguous as it seeks to gain theoretical consistency, this concept has undeniable heuristic value. Indeed, the concept of PSS (initial, pared-down definition: a combined offering of goods and services) has extended to cover more abstract content, and in particular the idea that everything is service.

In this section, we begin by discussing the analytical ambiguities introduced by enriching the concept of PSS (§ a). We then examine the implications in terms of the dematerialization/greening of different PSS formulations, distinguishing two cases: (i) Product-oriented PSS and dematerialization through the addition of services to products (§ b); (ii) Use-oriented PSS and dematerialization through the substitution of services for products (§ c).

a) Different PSS concepts, and some ambiguities

Strictly speaking, Product-Service System can be defined as the association (the joint supply) of products and services to meet consumer needs. Such systems existed long before the concept of PSS was explicitly introduced. Although other denominations reflecting the same idea (the combination of products and services to meet consumer needs) preceded PSS, these have been less successful (Bryson 2010). Examples include 'goods-services complexes' (Barcet, 1987) and 'compacks' - a neologism (from 'complex packages') coined by Bressand, 1986, (see also Bressand et al., 1989), comprising 'bundles of services and manufactured inputs'.

In the literature, the 'mechanical' definition of PSS soon gave way to a more complex definition, going beyond the combination of products and services to include utility and environmental issues. Thus, according to Manzini and Vezzoli (2002), "the concept of PSS promotes a focus shift from selling just products to selling the *utility*, through a mix of products and services while fulfilling the same client demands with less environmental impact".

On the whole, in recent literature, the PSS concept seems to be a heterogeneous category, covering various modalities of the (real, theoretical or even rhetorical⁹) integration of products and services. These modalities are described in the following terms (Mont, 2002; Tukker, 2004; Bryson 2010 Vandermerve and Rada, 1998 Boutillier et al., 2014): the association of physical products with intangible services; the definition of the product by the services it renders; the sale of the use of a product rather than the product itself (leasing, renting); the sharing or pooling of the use of a product, and repair rather than disposal. Such a broad and open definition of PSS introduces an ambiguity related to the confusion between the service as an activity (as opposed to a product) and the service as utility or use in the sense of economic theory. A PSS connects products and services. But the ambiguity arises, on the one hand, out of the semantic shift that characterizes the term 'service', and on the other, out of the nature of the relationship which causes a system to exist.

In an attempt to formally summarize these semantic ambiguities, Let's call P the product, S the service, s the final characteristic (utility, use value, service

⁹ This is sometimes a marketing discourse

characteristic), σ the general (generic) function attributed to a product, a service or a combination of products-services, Σ the service uses that can be made of the product P.

In contemporary literature, as we have just stressed, the PSS concept now, in an ambiguous and catch-all way encompasses a broad set of relationships (which are not always systemic), associating a product (P) and an expression of the service from among those just mentioned (S, s, σ , Σ). The main relationships in question are as follows:

- P + S. This is the PSS in the strict sense, combining tangible products with intangible services.
- Σ (P), which expresses the service uses of a product. These service uses include leasing, renting, sharing, pooling, etc. While a relationship between Σ and P does exist here, it can only be called a PSS via erroneous use of language.
- P (σ) or S (σ), which formalize the idea that a product or service is defined by the general function it performs: mobility, leisure, health, or education, for example. The relationship between P and σ and S and σ is not itself systemic. In reality a system exists only when P and S are combined to satisfy a function, which can be formalized as follows: (P + S) (σ).
- P (s) or S (s), which, in the Lancasterian tradition, reflect the idea that any product and service is defined by the service characteristics it provides. As in the previous case, the general idea is that products (like services) are defined by the service provided. The difference lies in the fact that the service is not approached in general terms (as a function), but rather broken down into more specific basic service characteristics (e.g. the transport or mobility function is replaced by a vector of service characteristics: speed, security, comfort, etc.). Both approaches to the relationship between products and services can have critical implications on both perception of the level of materiality and the definition of innovation. However, the relationship between P and s or S and s is not systemic. Indeed the service characteristics (s) are consubstantial to P and S; these are not external components capable of creating a system.

The first of the above relationships (P + S) reflects what the literature on PSS (Tukker, 2004) calls 'Product-oriented PSS', while all the other relationships fall within the scope of the 'Use-oriented PSS'.

b) Product-oriented PSS: dematerialization and greening through the addition of services to products

Product-oriented PSS are established by the addition of services to products. They may, however, take more or less sophisticated and integrated forms, featuring more, or fewer, added services. Within this product-oriented PSS diversity, it is possible to distinguish two main sub-categories, according to the knowledge-intensity of added services.

The addition of (relatively) low knowledge-intensive services: services around the product

The best-known form of product-oriented PSS is that which entails adding traditional services (generally those having (relatively) low knowledge-intensity) to a product.

These PSS are similar to what Furrer (1997, 2010) calls “services around the product”. Examples include the addition of different pre- and after- sales services, financial and insurance services, etc. which made Fordist economies so successful. Such PSS may be considered at micro level (the same company provides the combined supply of products and services) or at meso level (the joint offer is the result of a partnership between different actors). In the latter case, the PSS is more than just a design and product engineering concept since it also reflects a production and innovation network dimension.

It should be acknowledged that the original purpose of such a system is not ecological. By adding services to products, the objective pursued by companies is to gain a competitive advantage. Companies seek to improve the quality of goods, reduce costs, boost sales and thus increase profits. In some cases, the services added to the product can even be more profitable than the products themselves (Furrer 1997). By adding services to products, companies may also seek to lock down the relationship with the customer - in other words, to generate customer loyalty (Bryson 2010). The multiplication and tightening-up of service relationships (i.e. customer interaction) help keep the provider attentive to client needs, favouring adaption and innovation. It is now possible to state that the addition of services to products, and the concept of PSS, have enriched innovation theory, ahead of sustainable development theory. The two fields (innovation and sustainability) are now reconciled within this concept.

In this PSS approach, dematerialization arises out of multiple sources. First and foremost, it is mechanical (passive), a result of the rise of intangible services in the PSS. In other words, by adding services or service to products, the degree of immateriality of the entire PSS rises. In this way, the ratio between the ‘volume’ of material products and the ‘volume’ of intangible services serves an indicator of the degree of the service’s materiality/immateriality. Within the supply of a given industrial firm, the volume of intangible services may increase, outweighing the volume of material products. This development, which raises sectoral allocation issues, is illustrated by the case of iconic industrial companies (particularly in IT) that have essentially become service providers. It should be noted that in this simple PSS approach, the reverse process of adding products to services also contributes to the creation of a PSS. Such a process, however, helps increase materiality, rather than reduce it.

Dematerialization is also active for some added services. This is, of course, the case of repair and maintenance services, as well as of take-back and recycling services at the end of product life. All of these contribute to dematerialization through the expansion of the lifespan of either the products or some of their components, and by reducing use of virgin materials in the production process (Agri et al., 1999).

The addition of KIBS: the P-KIBS System

A product-oriented PSS can also be constituted through the addition of Knowledge-Intensive Business Services (KIBS) (various types of consultancy services, engineering, training, and research) to products (and services). The Product-KIBS system also contributes to dematerialization of the system, in a mechanically (passive) way, by the simple juxtaposition of intangible services and physical

products. This is not, however, the most important dematerialization/greening mechanism. Above all, KIBS contribute via an active role. Indeed, in this type of PSS, KIBS are primarily mobilized as agents of change. They can accompany and support the greening/dematerialization efforts of a business and corresponding innovations, whether technological or non-technological. A number of consulting companies have thus either specialized in providing greening services, or included this expertise in their service supply.

c) Use-oriented PSS: dematerialization through the real or theoretical substitution of services for products

The currently dominant PSS approach is broader than the previous one, since - beyond the systemic dimension (linking products and services), it is the distinction between products and services (and paradoxically between components of the system) that is called into question. Indeed, the main idea here is that, by nature, everything (including the product) is service and that material goods are subject to service uses. This PSS approach is called 'Use-oriented PSS'.

- From the theoretical (and sometimes rhetorical) point of view, this PSS approach falls within the scope of a perspective that reflects a radical change in perception of the nature of goods and services. In this vision "everything is service". Agricultural products, industrial products and services alike are of value only based on the service(s) or function(s) they provide.
- From the operational point of view, this PSS approach reflects, then, a change in the way products are used by consumers, associated with a change in the producer's business model. The company no longer provides products, and the consumer no longer acquires ownership of a product – rather, both respectively sell and buy the use of the product and the service it provides. From this perspective, products (such as cars, photocopiers, and machines) are no longer what are sold, but rather kilometres travelled, the number of photocopies made, hours of operation, and so on. This purchase of the service provided by the products can take many forms: renting and leasing (potentially even going as far as a 'pay per service unit' model¹⁰), as well as sharing and pooling.

In this PSS approach, dematerialization and greening are not limited to the rise of mechanical immateriality through the addition of intangible services. Here the sources of immateriality and greening are more complex and difficult to grasp. They are linked to the decline in consumption of durable goods and the efforts made by producers to upgrade durable goods (sources of the services they sell) or extend their lifespan.

Though it reflects a blurring of the traditional analytical 'product and service' categories, PSS also questions (scrambles) our analytical categories in the field of innovation (whether or not related to sustainable development): its nature, its actors, its appropriation regime and its evaluation systems. In a PSS, therefore, innovation in products can come out of innovation in complementary services (this is well known in

¹⁰ An illustration is provided in the area of rental and leasing photocopiers.

mature sectors, such as the automotive industry). Innovation takes systemic, architectural form. It concerns not only products as such, but also their consumption or use modes. It also raises appropriation issues, given the multiplicity of stakeholders (and in particular the role of the user). It requires innovations in our innovation and performance measurement apparatus, in order to reflect - beyond industrial and technical performance - environmental and social performance (Hyytinen et al., 2015).

Conclusion

Insofar as it is through their material dimension that economic activities damage the environment, the alleged immateriality of services is often seen as a guarantee of their natural sustainability. Unlike goods for which the production process swallows up exhaustible natural resources and harms the environment, services, by dint of their evanescent nature (long since emphasized by the founders of classical economics) are supposed to have a smaller environmental footprint.

In this work we have sought, firstly, to refute this myth of the immateriality of services. Even though a service outcome may be (or seem) immaterial, we must not forget the many materiality sources that the service conceals: materiality of the service medium, the production factors deployed and the production/consumption spaces, as well as materiality relating to interactivity (which is integral to the previous two vectors of materiality).

Moreover, the materiality/immateriality of a service is not an objective, intrinsic, technical characteristic. It depends, firstly, on the output convention adopted - that is, the scope agreed upon for definition of the service, whether this is its topographical delimitation or its time horizon. Massive underestimation of service materiality often results from the exclusion (as often practiced by official statistics conventions) of certain components (such as travel) from the scope of a service. The materiality of the service is similarly underestimated when it is limited to direct materiality, excluding indirect ('grey') materiality, which is 'incorporated' to buildings, furnishings, intermediate goods and technical systems in particular, as well as to intermediary services mobilized in the course of the service transaction. This service materiality also depends on the materialization/dematerialization strategies being implemented by service organizations.

Thus, while the service is not intrinsically intangible, innovation strategies can be implemented that will make it more or less material/immaterial. In this chapter, we have only briefly touched on service materialization (industrialization) strategies in order to focus on dematerialization and greening strategies.

In their relationships to services, such dematerialization strategies can take two forms, each covering different sustainable innovation trajectories. The first of these internal dematerialization/greening approaches describes a set of innovation strategies entailing services dematerializing and greening themselves through actions designed to affect the vectors of materiality: service mediums, production/consumption spaces, and production factors. The second form, known as an external materialization/greening strategy, encompasses a set of innovation strategies which comprise the dematerializing/greening of goods (and of the whole

economy) through services and service innovation. The PSS concept occupies an important position in these dematerialization/greening strategies. It reflects (though sometimes ambiguously) various mechanisms: mechanical (passive) dematerialization via the simple association (juxtaposition) of goods and services; more complex dematerialization, based on a unified ontological conception of goods and services (everything is service) and on changing production and consumption patterns and ownership regimes, and dematerialization/greening through active KIBS intervention.

Overall, we can conclude that services are not by nature intangible and green, but that they are capable of dematerializing and greening themselves via the implementation of appropriate innovation strategies. This process of dematerialization and greening, supported by sustainable service innovation, must however be qualified by a number of remarks, some of which may be considered interesting avenues for a research agenda:

- In this work, we have focused on the dematerialization dynamics of services and of PSS. However, in contemporary economies, the two often go hand in hand with the contradictory dynamics of materialization. These are the two inseparable faces of Janus. Gallouj et al. (2015) describe the industrialization/servitization dialectic as one of the most powerful megatrends at work in contemporary economies. We might also ask to what extent these two contradictory processes lead to a zero sum game in terms of materiality and sustainability.
- Analyses of dematerialization must take into account what is called the rebound effect. Indeed, the success of eco-friendly solutions can induce increased production and consumption, thus reducing the overall benefit.
- The two remarks above refer to the fundamental question of measurement systems. Most of our analyses remain theoretical or qualitative. The dematerialization issue raises formidable measurement problems. Thus, the idea of PSS sustainability - that is, their less material- intensive nature (though considered acceptable in theory) is not validated by measurement. This is an important research issue.

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XXV. International RESER Conference: Sustainable Development an Opportunity for Innovation in the Management Model of Public Organisations¹

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The literature recognises the great influence that environmental spending has in implementing LA21. But some authors raise doubt about the real commitment of local government after the signature of the Aalborg Charter or when they declare their adherence to Local Agenda 21.

This is the main objective of this paper, to verify the authenticity of political commitment towards meeting the objectives of sustainable development by means of the budgetary support to these policies or specific actions in favour of environment. We also verify the impact of the political character of the local governments on their behaviours in this respect.

To accomplish this verification, we apply the Difference in Differences technique for the period 2002-2012 in the Spanish municipalities. Results obtained confirmed the initial hypothesis and show how those local governments that adhered to LA21 have had a better evolution in their environmental expenses.

This article introduces a new perspective for the LA21 analysis, based on the study of local budgets as evidence of the actual commitment to the sustainable development strategy promoted by LA21.

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1. INTRODUCTION

1.1. Local governments and environmental management (Local Agenda 21 and Aalborg Charter)

In general, authors have identified an alternative, environmentally friendly, socially equitable, and sustainable development model with the term sustainability. This term is an ambivalent concept that raises two serious questions –first, the need to focus on political, social and economic issues, and, second, the need to define potential strategies to transform the current model. Regarding the management of collective proposals and problems related to legitimacy of governmental interventions, the sustainable development model boosts the value of participatory democracy against representative democracy, moving to the local level a large part of the role to the citizens. The Local Agenda 21 (LA21) meets these objectives and, therefore, is today one of the main instruments of management and intervention in favour of sustainable development.

The commitment, adopted at the Rio Summit in 1992, to promote sustainable development was reflected in four documents:

- The Declaration of Principles.
- WHO Framework, Convention on Climate Change.
- The Convention on Biodiversity.
- Agenda 21.

Agenda 21 consists of 4 sections developed into 40 chapters, in which the following issues are addressed: social and economic dimensions, conservation and management of resources for development, strengthening the role of major groups and means of implementation. The basis for action, objectives, activities and means of implementation for approval of the Local Agenda 21 are set out in the chapter 28 of the third section (Initiatives of local authorities in support of Agenda 21).

When it was adopted in 1992 at the Earth Summit, Agenda 21 was meant to be “a programme of action for sustainable development worldwide”. Furthermore, as stated in its introduction, it had the ambition of being “a comprehensive blueprint for action to be taken globally, from now into the twenty-first century”. The ambition was high, and so were the stated goals of the Agenda: to improve the living standards of those in need; to better manage and protect the ecosystem; and to bring about a more prosperous future for all.

Agenda 21 document is different from the other three documents mentioned because it is a plan of action. The implementation of the LA21 locally makes it possible to design intervention strategies for sustainability based on cooperation between governments and social partners. It is a strategic plan with the intention that the cities and municipalities assume their share of responsibility for the mobilisation of the citizenship in the effective management of the territory and the promotion of fair and long-lasting scenarios from the environmental, social, and economic points of view.

Since the Rio Conference, a timetable for implementation of Agenda 21 has been designed. That schedule included a consultative process at the beginning to encourage cooperation between local authorities at an international level. The first target stated that in 1996 local authorities of each country would have carried out the initial consultative process with their populations to agree on Agenda 21 at the local level.

In this process of intermediation between international organisations and local authorities, the International Council for Local Environmental Initiatives (ICLEI), which prompted the First European Conference on Sustainable Cities & Towns, held in the Danish city of Aalborg in 1994 at the request of the European Commission, has played a decisive role. At the Conference, the Aalborg Charter (Charter of European Cities and Municipalities for Sustainability) was adopted. The signature and adhesion to the Charter by local administrations is identified as the first step in the process of implementation of LA21.

The 'Aalborg Charter' (1994) is an urban environment sustainability initiative approved by the participants at the first European Conference on Sustainable Cities & Towns in Aalborg, Denmark. It is inspired by the Rio Earth Summit's Local Agenda 21 plan, and was developed to contribute to the European Union's Environmental Action Programme, 'Towards Sustainability'.

The Charter is based on the consensus of individuals, municipalities, NGOs, national and international organisations, and scientific bodies. There are three related parts to the Charter.

- Part 1 is a consensus declaration of European sustainable cities and towns towards sustainability.
- Part 2 relates to the creation of the European Sustainable Cities & Towns Campaign.
- Part 3 is declaration of intent that local governments will seek to engage in Local Agenda 21 processes.

The conference in Aalborg (1994) was followed by others, such as those held in Lisbon (1996), Turku (1998), Sofia (1998), Seville (1999) and The Hague (1999), in which the need was answered for strengthening participatory structures in the development of the A21 at regional level.

The XXI century started with Hannover (Germany) 2000, Aalborg (Denmark) 2004, Seville (Spain) 2007, Dunkerque (France) 2010, and Geneva (Switzerland) 2013. Gathering over 1000 participants from local governments and a variety of other actors across Europe, the European Conference on Sustainable Cities & Towns remains the largest European event for local sustainability. All conferences have been co-organised by ICLEI together with the respective host cities, and a Conference Preparatory Committee.

At the Third European Conference on Sustainable Cities held in the German city of Hannover in 2000, the need to standardise and regulate the different initiatives developed and give administrative support was raised. In this sense, the presentation of an initiative of systematic monitoring by defining specific standards or sustainability indicators was one of the major contributions of this conference. The final agreement stressed the need to establish and develop regional networks that enable greater

cooperation, exchange of experiences and dissemination of good practices, while ensuring greater economic and technical coverage of the various governments. Regarding this last point, the European institutions are encouraged to approve subsidies and grants under the Structural Funds scheme, subject to the existence of a sustainable development plan.

In the late nineties, 650 regional and local authorities from 32 European countries had achieved a commitment to local sustainability by joining the Aalborg Charter. In 2010 the number of local authorities that had signed the Aalborg Charter amounted to 2838.

Ten years after the release of the Aalborg Charter, the participants of the 4th European Conference on Sustainable Cities & Towns in Aalborg, Denmark 2004 (Aalborg+10) adopted the Aalborg Commitments - a list of 50 qualitative objectives organised into 10 themes:

1. Governance
2. Local management towards sustainability
3. Natural common goods
4. Responsible consumption and lifestyle choices
5. Planning and design
6. Better mobility, less traffic
7. Local action for health
8. Vibrant and sustainable local economy
9. Social equity and justice
10. Local to global

Local stories about the achievements in these 10 themes can be retrieved from the *sustainablecities* webpage at <http://www.sustainablecities.eu/local-stories/actionforhealth/>.

The move from Charter to Commitments signified a new, more structured and ambitious approach. To be signed by the political representative, the document requires the signatory to comply with time-bound milestones. Each local government is asked to produce a baseline review within a year of signature, conduct a participatory target-setting process and arrive at a set of individual local targets addressing all 10 themes within two years, as well as committing to regular monitoring reviews.

Agenda 21 recognises nine major groups of civil society, and stipulates the need for new forms of participation at all levels to enable a broad-based engagement of all economic and social sectors in making sustainable development happen. The Major Groups are Business and Industry, Children and Youth, Farmers, Indigenous Peoples, Local Authorities, NGOs, Scientific and Technological Community, Women and

Workers and Trade Unions. In this work, we will focus our interest on Local Authorities.

As in 1994 with the organisation in June 2004 of the last European Conference on Sustainable Towns (Aalborg + 10), the city of Aalborg has again become the capital of the local movement for sustainability. The Conference has assessed the existence of a large, active and aggressive local movement in favour of a more sustainable model of development, as well as the significant increase in the number of cities and municipalities that adhered to the Aalborg Charter. However, the success achieved over the past ten years has been devalued because it was found that adherence to the Charter of Aalborg sometimes has not meant more than just institutional declaration of good intentions, without anything definite or any action plan implemented (Brunet Estarellas et al., 2005). This last idea inspires the present work, in which the correspondence between the adherence to LA21 by local governments and the economic and budgetary support to sustainable projects will be verified.

In Spain, the Sustainable Development Strategy was introduced by the Government in June 2000, and included the commitment to promote a new model of integration and balancing of economic, social development and environmental protection in the long term. However, there has been a lot of criticism from certain political parties concerning the general nature of the document, the lack of budgetary measures necessary for momentum and a framework of broad and representative social participation and the absence of goals, commitments, priorities and specific deadlines. Given the discontent with the Spanish Sustainable Development Strategy, some regional governments have drafted their plans or strategies for sustainable development. In short, in Spain 'LA21 has become the symbol that presumes to include everything that is done at the local level to convert the overall design of sustainability into operational reality' (Font & Subirats, 2000).

1.2. Environmental Management and Innovation

Most scholars and policymakers now recognise that economic development cannot be explained solely by levels of investment, by education, by culture, by policies, or by type of government. There is, instead, a growing consensus that economic development is primarily a function of institutions that help societies to reap potential gains from interactions among independent actors (Hoff & Stiglitz, 2001).

While social scientists agree that institutions are crucial determinants of outcomes across a variety of societal domains, perspectives differ as to when to anticipate institutional innovation and how to predict the performance of particular institutions over time. Analysis of institutions is especially important in circumstances characterised by instability rather than continuity: both the direction and the consolidation of change reflect the characteristics of institutions and their relationships to various stakeholders (Doner, Richard F., 2010).

Faced with the institutionalisation of a hierarchical model of intervention and conventional planning, from top to bottom, with the launch of the LA21 an attempt has been made to encourage new participatory processes based on the formulation of strate-

gies from the bottom up, with a large and active citizen involvement. This alternative causes the administration, rather than controlling the process, to have as main objectives those of facilitating it, encouraging the participation of different social, political and economic actors, shifting the protagonism to the public in addressing issues and solving problems by means of the consensus. This means that public participation and leadership of local government become the more characteristic signs of the process.

The transition from a conventional model of governance to another multi-level and relational one increases the capacity of local actors to intervene, share responsibilities in defining objectives, and specify solutions, while broadening the exchange of knowledge and strengthening the possibilities for cooperation.

However, the implementation of the principle of subsidiarity requires prior redefinition of roles, both by public administration and the economic and social agents. One of the essential elements of LA21 as a factor of institutional change is the need to consult citizens, businesses, the various institutions and social partners during its implementation (Foh Lee, K., 2001).

From the institutional point of view, the desire of local authorities to take centre stage can be an incentive for these governments to explore ways of gaining legitimacy and demonstrate their ability to solve collective problems geographically localised. Institutional theory emphasises the relationship between organisations and the environment and the diffusion of innovations explained by institutional mechanisms.

Institutional pressures faced by organisations to which they have to respond have been analysed through institutional theory. It is an approach that does not focus on efficiency as the sole purpose of organisations, but pays more attention to the relations established by the organisations with the various stakeholders from whom they need backing and social support to survive, i.e. legitimacy. According to this approach, legitimacy is established as a main objective of the organisations, to explain certain of their behaviours. The pressures exerted by these stakeholders are felt to a greater extent in public organisations, since they face highly institutionalised environments and rely on public opinion to gain legitimacy and resources (Dobbin et al., 1993). In such institutional settings, legitimacy, not efficiency, is critical for the ability to secure vital resources.

The response of Spanish local councils to changes in their institutional context by implementing a sustainable practice like the Local Agenda 21 has been studied by Rocio Llamas-Sanchez, Victor Garcia-Morales, & Inmaculada Martin-Tapia (2013). The analysis carried out by these authors reveals some institutional factors that explain the process of institutional change, the outcomes of LA21, and the differences between local councils. From that institutional point of view, they consider LA21 to be an effective instrument for improving both the sustainability of towns and the management of local councils.

The thrust of Local Agenda 21 has been to promote public involvement in negotiating programmes for sustainability, and it is here that many local governments have grasped the opportunity for institutional innovation and community outreach (Mason, 2012). LA 21 could be the grass-root catalyst for serious institutional innovation at the local level (Koutrakou, 2004).

The plan assumes that local well-being does not depend fundamentally on “development factors” (of supply) that exist in a given area; it looks instead at the possibility of favouring and reinforcing capacities for economic, technological, social, and institutional innovation that emerge from the complex local interactions between supply and demand factors. This idea supports the argument of “systemic vulnerability” in the sense that various types of crises precede and stimulate innovation and institutional changes.

The strict version of this systemic vulnerability argument is that the creation or evolution of efficient institutions only occurs when political leaders confront popular discontent and external threats but lack resources to address these problems (Doner, Richard F., Bryan, Ritchie, & Slater., 2005). Under these conditions, institutional innovation helps to generate required resources. In the Spanish context we found a similar consensus. Institutional context offers opportunities to develop innovative behaviours. Innovation can be an alternative in the fighting of organisations against the contextual pressures (Llamas Sánchez, Rocío, 2005).

In a first stage the diffusion of innovations reflects the need to solve a problem, but in the next stage, organisations adopt innovations because of the threat of losing legitimacy and losing the support of stakeholders. As the number of organisations that adopt an innovation becomes greater, the value attributed to it increases. So, organisations that have not adopted that innovation appear as illegitimate to stakeholders.

The *ecologically sustainable development* strategy in Australia has been evaluated by Curran (2015) through the prism of ecological modernisation. This author regards Australia's ecologically sustainable development trajectory as a ‘meta policy’. Ecological modernisation proposes two key interrelated strategies for achieving sustainable development: the modernisation of production and its practices and the modernisation of the political sector and its institutions. Curran’s work focuses on the latter, particularly on the political commitment to ecologically sustainable development at the political elite level. In considering key moments in Australia's political modernisation story, the article finds that, despite important developments and innovations, the ecologically sustainable development and ecological modernisation experiment in Australia has had limited success in significantly and permanently shifting the government business relations of sustainability in ways that would respect the spirit and goals of ecologically sustainable development. This can in part be explained by the limited capacity of a reform process such as ecological modernisation to shift the political dynamics of environment–development relationship.

Nevertheless, Australia’s institutional change has also been examined by some authors from a different point of view (Macintosh, 2015). This article questions the effectiveness of *Ecologically Sustainable Development*, asking whether it has had a material impact on Australia's environmental institutions. The argument made is that, while ecologically sustainable development has had some success at the margins, its overall impact has been limited. The institutions necessary to ensure that policy makers impose and abide by a binding strong sustainability constraint based on the maintenance of natural capital have not been created. This work recognises that there have been advances in environmental protection since the early 1990s but, by and large, these have been a product of the same types of political and contextual factors that drove policy prior to the adoption of ecologically sustainable development. The score may have changed, but the rules have remained the same.

1.3. Background

Most works studying the development of LA21 in different geographical environments focus their interest on the analysis of the implementation strategies of the Agenda at the local level. Sustainability as defined by the Brundtland Commission is a composite and thus ambitious policy target. It comprises environmental, economic, social, and institutional criteria with equal importance. Because of this complexity, the first step of a Local Agenda 21 process should be to develop a vision of a sustainable society attached to indicators that help to measure progress, distance to target, and failures of plans or their implementations (Valentin & Spangenberg, 2000). For instance, Adolfsson (2002) studied four small- to medium-sized municipalities in the southeast of Sweden. The study shows that the LA21 processes have instigated many new ideas, brought fields together and introduced new subjects into the municipal world. It also confirms that there are signs of an extended dialogue and of public influence, especially within fields where citizens are directly involved. LA21 does not seem to have great influence on which natural resources are dealt with, but does on how they are dealt with. New stakeholders within and outside the municipal organisation have been identified through the LA21 processes, and more comprehensive ways of solving problems and a positive climate for testing new ideas have been created. In these respects LA21 has been and will be a significant support to the development of appropriate natural resource management at the local level.

In recent years we have found other works in a similar vein [(Foh Lee, K., 2001), (Robert Rutherford, Robert A. Blackburn, & Laura J. Spence, 2000), (Eckerberg & Forsberg, 1998)]. A realistic counterpoint to the official monitoring and assessment procedures of national governments and international bodies has been offered by Lafferty & Eckerberg (2013). These authors highlighted the problems of assessment and policy evaluation and clearly set out the policy stages necessary for more effective realisation of Local Agenda 21 objectives.

Another widely explored perspective for the LA21 analysis is focused on the measurement of sustainable development outcomes anticipated by the Agenda [(Poveda & Lipsett, 2011), (Thomas, 2010)]. Thomas pointed out that the literature-based review demonstrates the richness of this engagement and that while there is enough information about the range of engagement, there is little evidence to indicate the effectiveness of these policies. The assessment process implies the existence of tools, instruments, processes, and methodologies to measure performance in a consistent manner with respect to pre-established standards, guidelines, factors, or other criteria. Sustainability assessment practitioners have developed an increasing variety of tools. That paper discusses a range of fundamental approaches, as well as specific and integrated strategies for sustainability assessment, as the foundation of a new rating system being developed for large industrial projects. In this line of research we also found several recent papers [(Devuyst, 1999), (Haapio & Viitaniemi, 2008), (Lawrence, 1997), (Nijkamp & Pepping, 1998), (Papadopoulos & Giama, 2009), (Cole & Valdebenito, 2013)].

Hess and Winner (2007) summarised some case studies and recommended local government action in favour of environmental sustainability. In their opinion there are many opportunities for financially constrained cities to assist the development of 'just sustainability' projects with minimal financial commitments. They can do so by rechanneling the purchasing decisions of public agencies, building partnerships with community organisations and developing the small business sector.

The study "Sustainable Development in the 21st century" (2012) offers a detailed review of progress in implementation of Agenda 21 from an international perspective. It reveals how various chapters of Agenda 21 have progressed at different paces. Success in Agenda 21 has been highly variable. Despite being a comprehensive plan to deliver sustainable development, implementation has not always been systemic. For example, Agenda 21 has stimulated a much stronger notion of participation in decision making. This affirmation of the important role of non-governmental actors has infiltrated all levels of government, international law and international governance. Although Agenda 21 has acquired considerable coverage among nation states, its implementation remains far from universal or effective. Progress has been uneven, and despite some elements of good practice most Agenda 21 outcomes have still not been achieved. Nevertheless, regarding our main interest in this work, Local Agenda 21 has been one of the most extensive follow-up programmes to United Nations Conference on Environment and Development (UNCED) and is widely cited as an unprecedented success in linking global goals to local action. Many local authorities around the world have adopted some kind of policy or undertaken activities for sustainable development, either as a main priority or as a crosscutting issue. Progress so far does not mean that the work is over, but rather that there is potential to build further on the success. Multi-level governance is needed, as well as increased integration between local authorities and multi-stakeholders in their communities. (Stakeholder Forum for a Sustainable Future, 2012).

Regarding the assessment of the degree of implementation of LA21 in Spain, several recently published studies provide a complete picture of the situation [(Font & Subirats, 2000), (Hernández Aja, Agustín, 2003), (Echebarria, Barrutia, & Aguado, 2004), (Moralejo, Legarreta, & Miguel, 2007), (Hidalgo, 2008), (Martínez & Rosende, 2011), (Observatorio de la Sostenibilidad, 2014), (Jiménez Herrero, Luis M., 2008)].

Regarding the environmental expenditure, we would like to highlight the relevance of the work by Aguado and Echevarria (2004) in which, by simple correspondence analysis, they analyse the situation that relates to the Spanish regions (Autonomous Communities, AACC) concerning budgetary expenditure intended for various environmental items. To do this, they perform an AACC typology using as criteria the per capita spending by type of environmental activity in each region. The ultimate purpose of this research is to examine the relationship of the use of public funds with the implementation of Local Agenda 21. The information analysed at the level of each region, was obtained from a survey sent to different Environment Departments of the CCAA and an analysis of the reports published by these Departments regarding the AL21. Their hypothesis tries to demonstrate the great influence that environmental spending has in implementing LA21.

This work has some points in common with ours, since it uses the perspective of environmental expenditure to assess the degree of implementation of LA21 in the various Spanish regions. In fact this work raises some doubts about the coherence between the political commitment to the Charter of Aalborg and Towns Campaign and

European Cities for Sustainable Development and the actual implementation of local strategies for sustainable development economic support.

However, there are two main differences from ours. On the one hand, there are differences in the basic unit of analysis. The work of Aguado and Echevarria analysed the CCAA behaviour, while in this research municipalities have been utilised as the analysis unit. On the other hand, their statistical methodology was based on the *correspondence analysis*, while this paper uses the impact assessment by the technique known as *Difference in Differences* (DiD). We consider the comparison between the results that we obtained from the fixed effect panel data differentiated by CCAA and the groups of CCAA finally proposed by these two researchers, after applying the correlation analysis by budget items and environmental actions, to be of interest for further investigations.

1.4. Evaluation of public policies by DiD

The process of developing public policies can be broken down into three phases or stages:

- The formulation (ex-ante analysis, taking action as a reference). It is based on a diagnosis and a problem definition, so as to generate and analyse alternative solutions; thus we can select what we consider to be the most appropriate ones.
- The implementation, which should correspond to the implementation and control of the above formulation by taking operational decisions and concrete actions to affect the original public issue. In practice, the implementation typically deviates from the initial formulation for various reasons (design problems, political games, inadequate resources, etc.).
- Evaluation (ex-post study) allows us to measure the results and impacts achieved, describe the process developed, explain its determinants and constraints, and rate their degree of effectiveness. It is the basis for deciding whether to follow a policy evaluated, with or without modifications, or if instead we should proceed to its completion or replacement.

One of the first questions we should ask ourselves before examining the effect of any public policy is why we should assess it. Often policy makers focus on measuring inputs and immediate outputs of programs, rather than assessing whether the programs have achieved their objectives. Thus, the policy based on evidence comes to the forefront, of which the impact assessments is a very important part (Gertler, Martinez, Premand, Rawlings, & Vermeersch, 2011).

The analysis of the effectiveness of public policies is to test whether a concrete policy or action program has been capable of producing the desired effects or not. It should be based on data and opinions about what actually happened. This involves making sure that those effects have been produced, and that the policy has been its sole cause, ruling out other possible impacts of intervening variables.

These evaluations address three types of questions (Morra Imas & Rist, 2009):

- Descriptive questions: what is happening?
- Normative questions: comparing what is happening with what should happen.
- Questions about cause and effect: test results to determine the difference generated by the intervention carried out.

On the last question, it is what impact evaluations deal with, since they analyse changes in the results attributable to the program.

Quantitative methods emphasise the quantification and favour the use of experimentation in the impact assessment. Such experimentation seeks to establish causal links between the program and its effects. It relies on the methodological paradigm developed for the natural sciences, and tries to verify stable cause-effect relationships between certain actions and their presumed consequences.

The use of quantitative methods leads to the concept of counterfactual. That is what any chosen method should estimate, and that tells us what would have been the outcome for participants in the program if they had not participated in it. Therefore, in practice it requires finding a comparison group so as to estimate what would have happened to participants without the program.

Conducting a social experiment requires building a counterfactual condition that considers what would have happened if the intervention had not occurred. This design requires randomly creating two groups among the possible recipients of the evaluated activities, which ensures the statistical equivalence. In these two groups just one difference is introduced— the assessed program that is applied in one (experimental group, instance, or treatment) and not in the other (control group or untreated). Then it proceeds to make initial and final measurements in both groups on the topic of interest, to identify their different evolutions, whose only cause is linked to the policy developed in the case-only group (Cardozo Brum, 2013).

Thus, the econometric methodology used in modern evaluation of public policies can be summarised as follows: first, the causal relationship object of study is explicitly formulated. Then desired effects are estimated by using econometric methods on available data. Finally, the results are causally interpreted, so as to discover the implications for public policy (Durán, 2004).

There are different quantitative impact assessment methods such as random assignment, randomised promotion, and regression discontinuity design, which estimate the counterfactual through explicit allocation rules of the program that the evaluator knows and understands. But there are other methods, such as difference-in-differences (DID) and pairing, that provide additional tools that can be applied when the program assignment rules are less clear or when the application of any of the above three methods is not feasible. Specifically, the DID method estimates the counterfactual change in the result for the treatment group by calculating the change in the result for the comparison group, which allows taking into account any constant difference in the time between the two groups (Gertler et al., 2011).

In more detail, what it is being applied is the double difference. The first difference is calculated taking into account the results before and after of the experimental group, that is, considering the constant factors in time for the same group. But to observe the variable factors over time we should measure the change before and after the results in the control group that was exposed to the same conditions. This is the sec-

ond difference. Thus, the DID method would combine the two false counterfactuals (before and after comparisons and comparisons between experimental-control groups) in order to generate a better estimate of the counterfactual. This method does not require rules for the allocation of individuals in the treatment group, but requires that the control group could represent a change in the results that the treatment group have experienced in the absence of the program.

In other words, the identification of the effect of a program/policy could be intuitively treated in two ways:

1) Compare participants (“treated”) and non-participants (“untreated”) (in cross-section): simple “differences estimator” (OLS)

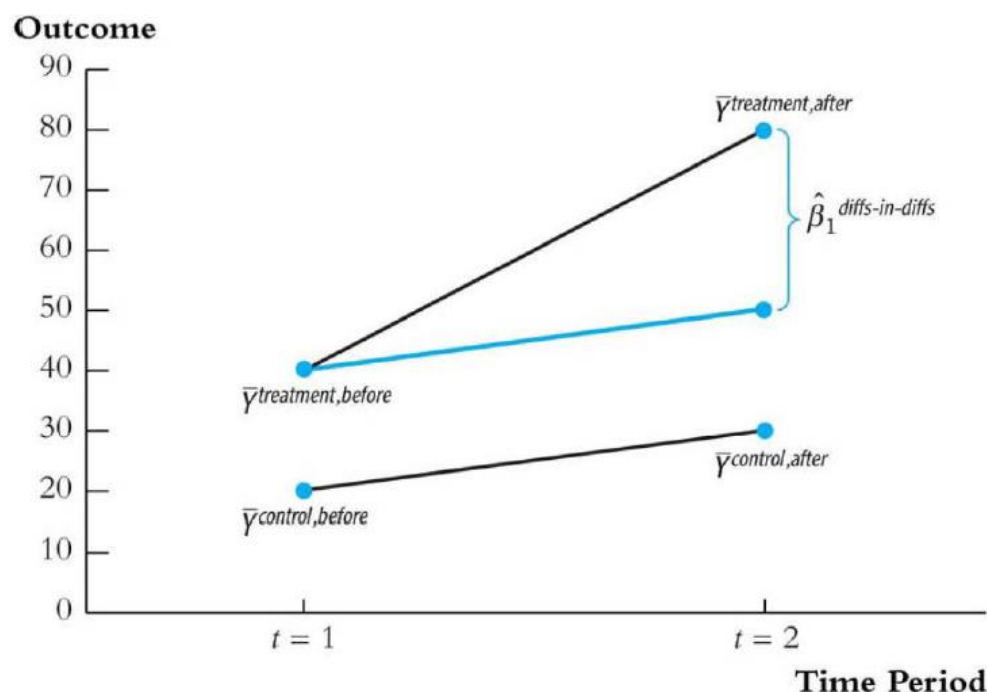
This methodology presents the problem of unobserved differences between treated and untreated that are correlated with outcomes

2) Compare outcome of individuals who participate, before and after “treatment” (in panel data set):

The problem in this case is due to the omitted time-trends (e.g. business cycles)

In order to solve the previous problems, the solution comes from the technique known as Differences-in-Differences Estimator (DID) (time-constant differences, and time-trends differences between treatment and control groups)

The use of this method is subject to one condition, to have a panel data, where entities (e.g. individuals or states) are observed at two or more points in time.



$$\hat{\beta}_1^{diffs-in-diffs} = (\bar{Y}^{treat,after} - \bar{Y}^{treat,before}) - (\bar{Y}^{control,after} - \bar{Y}^{control,before})$$

Fig. 1: Graphic illustration of the Differences-in-Differences Estimator (DID)

1.5. Objectives

The main objective of this work is to measure the differences, in terms of environmental spending, between Spanish municipalities that adhered to the LA21 and those that have not.

The idea is to link environmental expenditure with the political commitment of local governments to achieve the goals set by the LA21. As we have stated above, there have been several studies that have questioned the authenticity of political commitment towards meeting the objectives of sustainable development, by local governments that have adhered to the Local Agenda 21.

With this approach we are ignoring the issue of efficiency in spending. However, in Spain most of the projects considered examples of good practice (Federación Española de Municipios y Provincias-FEMP & Observatorio de la Sostenibilidad en España-OSE, 2013) are linked to relevant initial investments. This circumstance makes it reasonable to link the political commitment to the variable "environmental expenditure".

The specific objectives are the following:

- Comparison of the behaviour of municipalities in the control group and the experimental group
- Influence of political orientation of local governments
- Influence of the population
- Influence of the overall volume of budgetary funds

1.6. Research questions

- Do the municipalities that adhered to the LA21 devote a larger share of their budgets to environmental expenditures?
- Is adhering to the LA21 a determining factor when it comes to devoting more of their budget to environmental expenditure, despite the economic crisis and budgetary constraints imposed on the municipalities from the central government?
- Are the influence of the political character of local governments, the number of inhabitants, and the volume of the overall budget on environmental expenditure statistically significant?

1.7. Differential contribution of the work

The differential contributions of this work are specified in the following aspects:

- The dependent variable is the environmental expenditure, understood from the perspective of the functional classification of municipal budgets
- Approach linked to the process of innovation in the management of local governments
- Implementation of DiD methodology for measuring the impact of public policies
- Use of municipal entities as the unit of analysis

1.8. Sequence of other sections of the article

The following section describes the methodology used in the work, including hypotheses tested. The temporal and geographical scopes of the work, the data sources, and the treatment of these data for the selection of the final sample are all explained. Then, in the results section we will present the results, differentiating the descriptive analysis and the analysis by econometric models (DiD). We will close the work with a conclusions section, where the results referring to the hypotheses posed in the methodology section are discussed. Work constraints and major implications for local politics are also included in that section. Finally, we also discuss further research lines in the future to complement this study.

2. METHODOLOGY

2.1. Hypothesis

- The municipalities that adhere to the Local Agenda 21 devote more budgetary resources to expenditure functions related to the environment.
- The municipalities with local government political tendencies towards the left devote more budgetary resources to expenditure functions related to the environment, or reduce these resources the least, even in times of crisis.

2.2. Temporal and geographical scope

Regarding the temporal scope, the period 2002-2012 is covered. The geographic scope covers 100% of the national territory.

2.3. Data source and processing. Description of variables (experimental and control)

The analytical work of this article is based on a database of our own construction, in which we have combined the data from the final budgets for 2002, 2010, 2012 and 2013 and the initial budget for 2014, the population of each municipality for the years studied, the results of the municipal elections (1999-2011) and the ideology (L / R) of the political party that won the most votes in the municipal elections.

Regarding the budget, data have been obtained from the website of the Ministry of Finance and Public Administration (<http://serviciosweb.meh.es/apps/EntidadesLocales/>). It is important to note that there was a change in the accounting rules of local governments that generate a difference of content in programs of environmental expenditure between 2002 and 2010. Since 2010, the accounting methodology has been homogeneous.

In accordance with the Order of September 20, 1989, by which the structure of the budgets of local authorities is regulated, we have identified two spending sub-functions for the year 2002:

4.4 COMMUNITY WELFARE.

It includes all costs relating to activities and services aimed at improving the quality of life in general.

It will be charged with costs derivatives maintenance, upkeep and operation of the services of treatment, supply and distribution of water; collection, disposal or treatment of waste; street cleaning; office of consumer information; protecting and improving the environment; cemeteries and burial services; slaughterhouses; markets; fairs and exhibitions, etc.

The sub-functions typified include:

4.4.1 Treatment, supply and distribution of water.

4.4.2 Waste collection and street cleaning.

For this work, the variable environmental expenditure in 2002 is the sum of the costs incurred by the municipalities in the sub-functions 441 and 442.

In view of the results obtained, the content of these two sub-functions are not comparable to the costs included in the 17th policy "Environment". This policy is present in budgets subsequent to 2010 (Order EHA / 3565/2008, of December 3, in which the structure of the budgets of local authorities is approved). The 17th policy includes four programs:

170. General administration of the environment.

171. Parks and gardens.

172. Protecting and improving the environment.

179. Other activities related to the environment.

Nevertheless, because the programs do not indicate the specific content of the expenses included in each program, to simplify the analysis, we used aggregate spending in the 17th policy as variable of analysis from 2010.

Therefore, the concept of environmental expenditure is taken from the functional classification of municipal budgets by reference to the sum of the sub-functions 441 and 442 for 2002 and policy no.17 in 2012.

Data related to electoral consultations in recent legislatures have been obtained for Consultation Election Results of the Ministry of Interior for 1999, 2003, 2007 and 2011 (<http://www.infoelectoral.interior.es/min/areaDescarga.html?method=inicio>).

In total, a database with 11,857 records corresponding to those of local authorities that are in the budget database of the years 2002 to 2014 has been designed. From this whole, a sample of 1273 municipalities has been selected. To achieve this sample, we applied the following exclusion criteria on the whole of those of local authorities:

- Municipalities without environmental expenditure in 2002
- Municipalities without environmental expenditure in 2012
- Local government entities without associated population (Other municipalities: Councils, Commonwealths, Counties, etc.)

Of these 1273 municipalities that collected environmental cost in their budgets, the experimental group is composed of 161 Spanish municipalities that in 2002 had adhered to the AL21². That is, after applying the exclusion criteria, 1273 municipalities, of which 143 belong to the experimental group (LA21) and the remaining 1,130 to the control group, were included in our study sample.

Table 1 provides information on the coverage of the sample with respect to the whole, in terms of number of municipalities, population and territorial coverage.

² Data obtained from the study of Hernández Aja, A. (2003). According to this study 409 municipalities were adhered to the Aalborg Charter in 2002. 189 municipalities adhered to the Aalborg Charter confirmed their commitment in a survey. 143 of them appear in our database with environmental costs in their budgets.

	No. Municipalities	Population 2002	Population 2012	No. Regions
Experimental Group	143	15,111,812	16,469,325	14
Control Group	1,130	16,819,579	19,700,568	18
Total Sample	1,273	31,931,391	36,169,893	
Total Population	11,857	39,588,411	47,113,180	19
Sample / Population	10.74%	80.66%	76.77%	73.68%

Table 1: Coverage of the sample

The coverage of the municipalities included in the sample exceeds 73% in terms of territorial coverage and 76% in terms of population. The population included in the experimental group represents 38% and 35% of the national population in 2002 and 2012 respectively.

The variables included in the models are the following:

- Environmental expenditure (final budget)
- Total budget expenditure (final budget)
- Population
- Local governments policy trend

For the treatment of data and application of statistical techniques, software packages, SPSS (Statistical Package for Social Sciences), SAS (Statistical Analysis Software) and Eviews 8 have been used.

2.4. Difference in differences

Difference in Differences treatment effects (DID) have been widely used when the evaluation of a given intervention entails the collection of panel data or repeated cross sections. DID integrates the advances of the fixed effects estimators with the causal inference analysis, when unobserved events or characteristics confound the interpretations (Angrist, J.D. and Pischke, J., 2009).

Despite the existence of other plausible methods based on the availability of observational data for quasi-experimental causal inference -i.e. matching methods, instrumental variable, regression discontinuity-, DID estimations offer an alternative reaching the unconfoundedness by controlling for unobserved characteristics and combining them with observed or complementary information. Additionally, the DID is a flexible form of causal inference, because it can be combined with some other procedures, such as the Kernel Propensity Score and the quintile regression (Villa, 2012).

For econometric assess, the impact of the Local Agenda 21 (LA21 onwards) on spending the next base regression is used:

$$\text{Environmental Expenditure} = a_0 + a_1G + a_2T + a_3G*T$$

G is the dummy variable that distinguishes the group (treatment or control).

T is the dummy variable defining the baseline and the endline.

G * T is the interaction between the dummy variables G and T; its estimated coefficient is the value β_1 , statistical of difference in difference, which is that which assesses the impact of LA21 spending on sustainability.

The final budget of the two years of comparison, population, and political character of the municipalities of the sample have also been included as independent variables, along with the dummy variables referred to above, in the estimates.

To make the estimates, two data panels were built. One was by provinces and the other by Autonomous Communities. In this paper only the results of the panel CCAA were included. The calculation procedure used was fixed effects. Thus, in addition to estimating and evaluating the impact of LA21, comparisons between provinces and between regions could also be made.

3. RESULTS

3.1. Descriptive results

For the descriptive analysis of trends in the variables studied, we offer a somewhat longer time perspective covering the period 2002-2014.

Population: the Spanish population experienced a large increase in the first decade of the 21st Century, going from 39.7 million in 2002 to 47.1 million in 2012. From 2012 to 2014 the resident population was reduced as a result of the economic situation, which has led to the return of immigrant populations to their countries of origin and the departure of Spaniards to other countries.

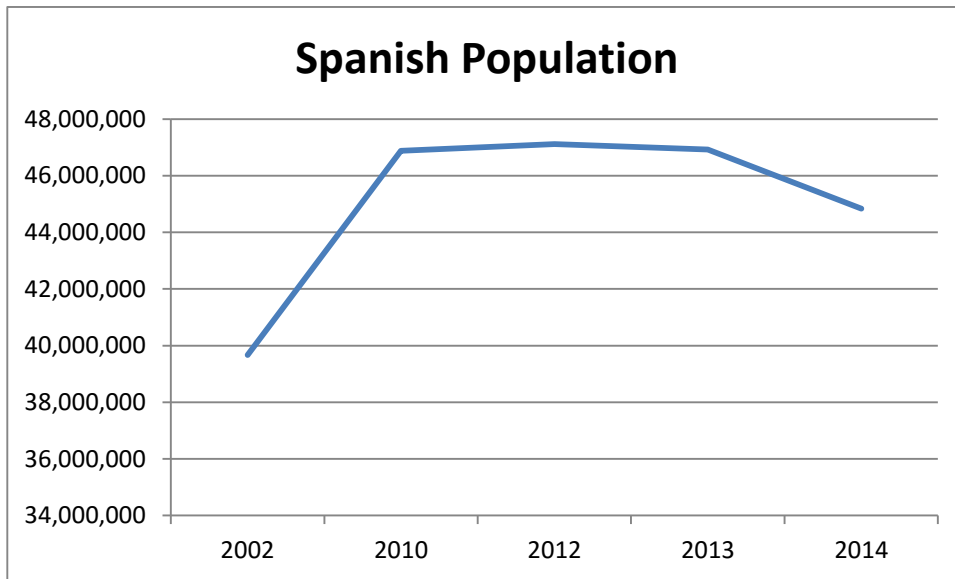


Fig. 2: Spanish population trend

Municipal budgets: The evolution of local budgets also shows a similar profile to the population in its evolution. After a strong growth in the period 2002-2010 with a maximum value of 81 billion euros, the subsequent recession did not slow down until 2014. The reduction of local budgets from 2010 is a key contextual element for understanding the reductions of environmental spending during the economic recession in Spain.

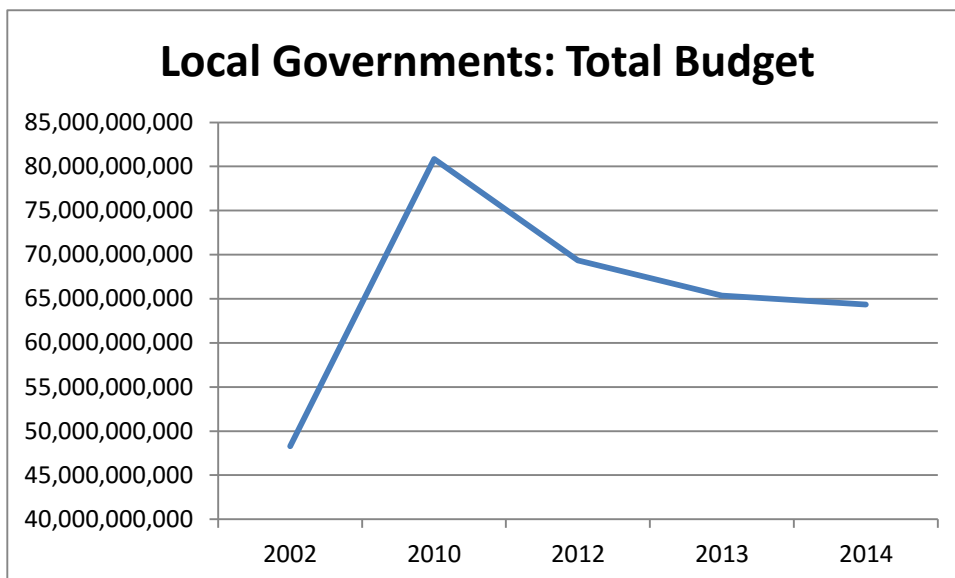


Fig. 3: Local governments' budget trend

Environmental expenditure: In the analysis of this variable, we must not forget the break in the series in 2010, as a result of a new accounting regulation that amended spending programs intended to concentrate the environmental expenditure. The two existing items in the 2002 budget were very general headings, in which concepts

such as sanitation, water supply and distribution, or waste collection and street cleaning were included, which have subsequently come to be integrated into normal community services, and since 2010 have been considered expenditure on environmental conservation.

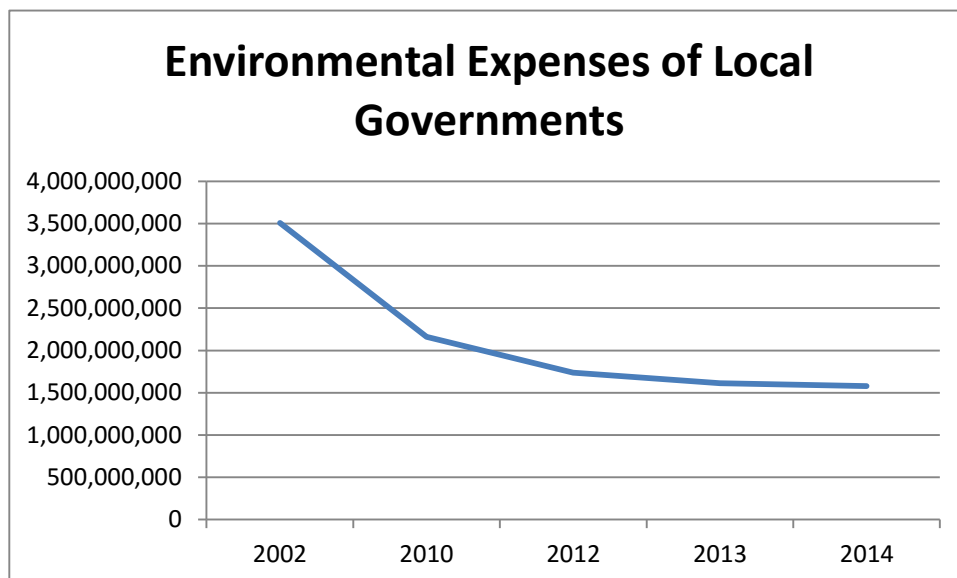


Fig. 4: Environmental expenditure trend

The observable decline between 2002 and 2010 is due to the change in the budgetary rules, but the subsequent decline and final stabilisation in 2014 are associated with the reduction experienced by the total municipal budget.

Relationship between environmental expenditure and the total budget: Regardless of the methodological change in 2010, from this year the percentage of environmental spending remains relatively stable at around 2.5% of the total municipal budget.

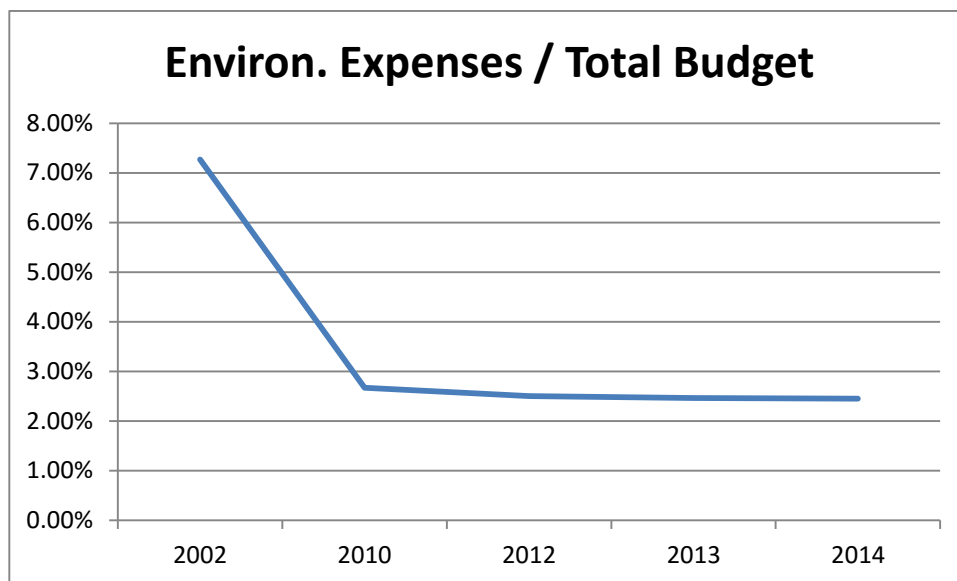


Fig. 5: Environmental expenses over total budget

The environmental expenditure is concentrated in the 1273 municipalities included in the selected sample. This percentage in the municipalities of the sample that adhered to the LA21 is significantly higher, reaching 3.79% in 2012.

Political tendency of municipal governments: Given the large number of political parties that participated in the last four municipal elections, 1391 parties, a great difficulty in knowing the political affiliation of each of them arose. To simplify the analysis, we chose the ten political parties that have obtained the most votes in a greater number of municipalities. These ten parties, because of coalitions between political parties produced during the period 2003-2011, have been reduced to 7 (CiU, EAJ-PNV/EA, ESQUERRA-AM, IU, PAR, PP, PSOE).

Comparing the percentage of the total environmental budget expenditure in the experimental and control group, there are higher percentages for the LA21 group and the right-wing political trend in both time periods 2002 and 2012.

	a	b	c	d	a/c	b/d	
MUNICIPALITIES	ENV EXP 2002	ENV EXP 2012	TOT BUDG 2002	TOT BUDG 2012	2002	2012	Var. 02/12
NON LA21	1.352.919.098	588.066.873	13.034.515.036	18.036.936.015	10,38%	3,26%	-68,59%
-	390.659.493	163.964.146	3.581.523.399	4.893.871.137	10,91%	3,35%	
Right	711.367.187	317.049.302	6.658.540.338	9.319.778.971	10,68%	3,40%	
Left	250.892.418	107.053.426	2.794.451.299	3.823.285.906	8,98%	2,80%	
LA21	1.486.438.753	705.181.204	13.252.182.228	18.624.814.870	11,22%	3,79%	-66,24%
-	402.608.627	155.521.066	4.226.207.366	5.754.219.046	9,53%	2,70%	
Right	940.859.295	478.380.005	7.327.268.475	10.548.047.693	12,84%	4,54%	-64,68%
Left	142.970.832	71.280.132	1.698.706.387	2.322.548.131	8,42%	3,07%	-63,54%

Table 2: Environmental expenditure trend according to political character of local governments

However, the variation (decrease) between 2002 and 2012 is less for the municipalities included in the group of LA21, and within this group, for municipalities with left-wing local governments.

3.2. Results of statistical models

The results of the estimates were verified by statistical software packages mentioned in the methodology section. All estimates have undergone the appropriate tests to verify that the required assumptions thereof (normality of residuals, heteroskedasticity, multicollinearity, no correlation of disturbances) are met, as well as the various criteria that inform on the predictive capacity of the models.

Description of the variables used:

- Dependent variable: SUBF 441_442_02-12 (environmental expenditure budgets 2002-2012).
- (G) Dummy Group experimentation / Control: A21_RU2002
- (T) Dummy compared years: T
- (GT) Dummy interaction: GT
- POBLACIÓN_0212, TOTLIQUID_0212, and SIGNO_9911, correspond respectively to population, final budgets, and political character for the municipalities included in the sample.

Estimates of Fixed Effects ^a							
Parameter	Estimate	Std. Error	df	t	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
[SIGNO_9911=0]	-449570,614021	201074,055077	2538	-2,236	,025	-843856,552462	-55284,675579
[SIGNO_9911=1]	-762159,375184	189779,687332	2538	-4,016	,000	-1134298,197809	-390020,552558
[SIGNO_9911=2]	-675825,919982	248628,529907	2538	-2,718	,007	-1163361,386456	-188290,453508
T	-806149,441507	214285,341454	2538,000	-3,762	,000	-1226341,379831	-385957,503184
GxT	-3741785,259126	639468,005900	2538	-5,851	,000	-4995717,511663	-2487853,006588
A21_RU2002	-1214979,814413	461648,029969	2538	-2,632	,009	-2120225,031935	-309734,596891
POBLACION_0212	175,497457	4,088620	2538,000	42,923	,000	167,480085	183,514829
TOTLIQUID_0212	-,068118	,003538	2538,000	-19,254	,000	-,075056	-,061181

a. Dependent Variable: Environmental Expenses Sub-Function 441-442 (2002-2012).

Estimates of Fixed Effects ^a							
Parameter	Estimate	Std. Error	df	t	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Intercept	-2713655,690938	655286,711956	2523,000	-4,141	,000	-3998610,475229	-1428700,906646
T	-815910,814916	209774,206516	2523	-3,889	,000	-1227258,039522	-404563,590310
GxT	-3619443,941974	632103,880363	2523	-5,726	,000	-4858939,403155	-2379948,480792
A21_RU2002	-1688445,428590	464588,461879	2523,000	-3,634	,000	-2599459,120652	-777431,736529
POBLACION_0212	181,815776	4,122337	2523,000	44,105	,000	173,732266	189,899287
TOTLIQUID_0212	-,073301	,003556	2523,000	-20,615	,000	-,080273	-,066329
[CCAA=Andalucía]	1323047,427283	688850,820564	2523	1,921	,055	-27723,374868	2673818,229434
[CCAA=Aragón]	1105050,132849	944834,507920	2523	1,170	,242	-747680,281434	2957780,547132
[CCAA=Canarias]	2497477,969982	809344,548087	2523,000	3,086	,002	910430,452872	4084525,487092
[CCAA=Cantabria]	2400435,667538	955289,744648	2523	2,513	,012	527203,530560	4273667,804516
[CCAA=Castilla y León]	1371902,434442	808536,950522	2523,000	1,697	,090	-213561,460818	2957366,329701
[CCAA=Castilla-La Mancha]	2552318,398439	739367,013344	2523	3,452	,001	1102490,157136	4002146,639743
[CCAA=Cataluña]	2809301,216228	683700,274408	2523,000	4,109	,000	1468630,144172	4149972,288284
[CCAA=Cdad. Foral de Navarra]	3023282,966256	833119,001158	2523	3,629	,000	1389616,012707	4656949,919806
[CCAA=Comunidad de Madrid]	1845447,796493	822795,793396	2523,000	2,243	,025	232023,669421	3458871,923565
[CCAA=Comunitat Valenciana]	2044546,284755	708115,513234	2523,000	2,887	,004	655999,256469	3433093,313041
[CCAA=Extremadura]	1268283,528775	1051012,253373	2523,000	1,207	,228	-792651,324139	3329218,381689
[CCAA=Galicia]	1576514,993906	735950,514567	2523	2,142	,032	133386,181065	3019643,806746
[CCAA=Illes Balears]	2763401,913997	887057,880556	2523,000	3,115	,002	1023965,959065	4502837,868929
[CCAA=La Rioja]	1018192,595908	1479553,021878	2523	,688	,491	-1883069,858203	3919455,050018
[CCAA=Melilla]	20136994,594814	3608162,353674	2523,000	5,581	,000	13061732,126852	27212257,062775
[CCAA=País Vasco]	2840030,554520	753279,882418	2523	3,770	,000	1362920,503052	4317140,605988
[CCAA=Principado de Asturias]	718712,970460	917913,102969	2523,000	,783	,434	-1081227,134694	2518653,075615
[CCAA=Región de Murcia]	0 ^b	0

a. Dependent Variable: Environmental Expenses Sub-function 441-442(2002-12).

b. This parameter is set to zero because it is redundant.

Table 3: Fixed Effects Model 2002-12 CCAA

It is noted that this is a very good estimate, with very low p-value in almost all the variables, which indicate very favourable statistical significance individually and jointly.

The coefficient of the interaction between the dummy variables of the model (GxT) is very significant and negative. The negative sign is due to the descending trend of local government's budgets and to the values of the temporal dummy (base year 0 and 1 year comparison). At any rate, the negative sign is indicating that belonging to the LA21 has been important to increase, or decrease less, the environmental spending during the period 2002-2012.

The coefficient of the variable referred to the budget liquidation also has a negative sign. This indicates that these budgets have declined, but its influence is significant in spending on sustainability.

The population was also significant, although positive, which would indicate that the population has a positive influence on the sustainability expenditure trend (in this case negative), but its influence is not the most important factor.

Finally, the political character of the left-wing municipalities (value 0) was a significant variable, like those of the other two trends (right and center), but with the highest coefficient value (negative). This fact indicates that it is the variable that exerts a great-

er influence on the overall increase (or lesser decline) in budgetary allocations for sustainability.

Among the regions with significant and positive coefficient results, Navarra, Basque Country, Cataluña and Baleares stand out. The municipalities of these autonomous communities that adhered to the LA21 are those that have the greatest influence on the results of the general model.

The above results are also confirmed for comparisons between the budgets for 2002-2013, and 2002-2014.

4. CONCLUSIONS

The hypothesis that belonging to the LA21 has had an important statistically significant effect on local spending on environmental measures is confirmed. The population, the total budgetary expenditure and the leftist politics of the municipalities have exerted a significant influence on the evolution of environmental expenditure. In those municipalities governed by left-wing parties, actions dedicated to sustainability have been maintained or they have not declined as much as in the municipalities governed by right-wing parties.

Despite the verification of our hypotheses tested statistically, some methodological limitations of this study should be noted, although in our opinion, in no case did these limitations question the validity of the results:

- The change in accounting methodology of local authorities that causes a break in the time series of environmental spending. However, we consider that, since this circumstance affects all municipalities, it does not invalidate or limit the power of DiD analysis when assessing the impact of adhesion to the LA21 on the environmental municipal spending.
- The model of sustainable development promoted by the LA21 includes three objectives: economic, social, and environmental. In this paper we have addressed only the analysis of the environmental dimension.
- No official statistics are available regarding the political parties to which mayors who governed the Spanish municipalities in the years 2002-2012 belonged. To calculate the political tendency of municipal governments, we have used the statistics resulting from the elections of 1999-2003-2007 and 2011. The party that won the highest number of votes has been regarded as the political character of each electoral period.

As for the policy implications, it should be noted that maintaining budgetary allocations for environmental expenditure in a period of economic crisis and budgetary constraints imply a high commitment to the objectives of Agenda 21 in terms of promoting a model of sustainable development. Our work shows that in the municipalities adhering to the LA21 this effort has been even greater. However, we must not forget that the environmental commitment has also meant an additional way for re-

covery of the role and legitimacy of local governments for stakeholders. In this sense, it is expected that the economic recovery begun in 2014 by the Spanish economy will accentuate the effect of the innovation process in managing local governments and that this will be reflected in a higher intensity of the items of environmental expenditure in the coming years.

In this paper we have presented the results of the comparison in the period 2002-2012. The first line of progress in this investigation will be marked by the extension of the temporal scope thereof, incorporating two additional comparisons from 2002 to 2013 and from 2002 to 2014. Although we have some information, we have preferred not to include these periods in this study for two reasons— first, because there is no information of Navarre and Basque Country in the data used for the years 2013 and 2014; second, because the information of 2014 is exclusively in reference to the initial budget, not to the final budget.

Nevertheless, preliminary results indicate that, despite the limitations discussed, the results of the estimation reaffirm what we said before, even giving more weight to the sample selected and to the methodology applied. However, this extended time period will be conducted when definitive budget data for the years 2013 and 2014 are available.

The second line of advance in this work focuses on the distinction between urban and rural municipalities. In this case, an overall estimate has been made with all municipalities of the sample. However, in order to refine the policy implications of the results, it would be interesting to know whether the results are homogeneous for both groups of municipalities, urban and rural. This segmentation of the sample would also allow the comparison between our results and those obtained in other studies.

Finally, we end up by emphasising the verification of the assumptions made and the appropriateness of the DiD method to confirm them. Thus, we see that the political commitment expressed by the Spanish municipalities by signing the Aalborg Charter and adhesion to the LA21 is supported with greater intensity in fiscal effort and increased resources for environmental programs.

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Creating and Capturing Value for Different Types of Services - A Contingency Approach

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Creating and Capturing Value for Different Types of Services

- A Contingency Approach

Abstract

Services can be differentiated by their basic value propositions. In this paper, we discern five archetypes of services—logistics services, facility services, entertainment, network-access services, and analytics services—that differ fundamentally across technologies and institutions in terms of their value propositions. These service archetypes also differ substantially in terms of how customer value is created and captured. Value-creation essentials, including critical capacities and competencies, are indicated for each service archetype. Value-capture essentials, including isolating mechanisms, are also highlighted. In addition, we develop a diagnostic framework through which service providers may check whether their value propositions and resource configurations are aligned. If misalignments are uncovered, the framework provides suggestions for how service providers can achieve strategic fit.

Key words: Service archetypes, value-creation essentials, value-capture essentials

Introduction

To an increasing degree are services dominating developed economies and successful strategies for service providers are therefore in still higher demand. However, services are manifold and require different strategies and there exists no one-size-fits-all strategy for service providers (see, for example, OECD, 2005). Hence, a key contention in this paper is that services differ fundamentally across technologies and institutions in terms of how customer value is created and captured by the service provider. This assertion links up to a very general and contentious question in strategy research, namely: Is it possible for strategy scholars to provide managers – including those operating in the service sector - with practical prescriptions as to how their firms should create and capture value, and thereby achieve a sustainable competitive advantage (SCA)? Not surprisingly, the strategy literature gives contradicting answers to this question. One short and vigilant answer is *no*, which reflects the view that success formula are multifarious and based on highly idiosyncratic resources (Rumelt, 1984; Peteraf, 1993) and, to some extent, random, as they can be contingent on luck rather than managerial discretion (Denrell, 2004; Ma, 2002; Svensson and Wood, 2005; Salganik, Dodds, and Watts, 2006).² Therefore, proponents of this view suggest that instead of engaging in the futile task of attempting to uncover specific success recipes, strategy scholars should concentrate on developing general and generic schemes for achieving competitive advantage, such as the value-chain template (Porter, 1985), the VRIO framework (Barney, 1997), and the business model canvas checklist (Osterwalder and Pigneur,

² Refer also to the recent *Steve Jobs was not a genius but just lucky* arguments promoted in the business press, e.g., Goldberg (2012) and Moltz (2012).

2010). Those strategy scholars who have nevertheless ventured into a search for company-specific recipes of success through empirical observations of high-performing companies (e.g., Bullen and Rockart, 1981; Peters and Waterman, 1982; Porter, 1990; Kim and Mauborgne, 2005) have been criticized for their retrospective, uncontrolled, and unfalsifiable methodologies, as well as the lack of *sustainable* success or simple survival of the observed companies, which becomes evident with hindsight.

In an attempt to reconcile these two contradictory views, the strategy and marketing versions of the contingency approach (Govindarajan, 1988; Katsikeas et al., 2006; Zeithaml et al., 1988) aim to prescribe optimal strategies given a certain set of difficult-to-control factors, known as “contingencies,” within or outside the firm. The contingency approach assumes that it is possible to provide managers with guidance as to the best strategic responses to observed contingencies. However, even though the contingency approach can prescribe an optimal course of managerial action with regard to SCA, the prescription may only apply for a few firms facing similar contingencies. In other words, such a management prescription may not be generalizable. In the extreme, the strategy prescription may only apply to a single firm, in which case the contingency approach takes on the characteristics of business consultancy. Furthermore, the extent to which the contingency approach can deliver generally applicable management prescriptions depends on the nature of the contingencies. If the contingencies are many and equivocal, such that every situation is unique, the scope for generalization is limited. Conversely, if the contingencies are few and distinctive, the space for generalization is larger. Therefore, if we can identify contingencies that are few, distinctive, and of relevance to the service providers that are the focal point of this paper, we can move one big step closer to our aim of defining value-creation and value-capture essentials for service providers.

The paper proceeds in the next section with a discussion of and a search for a set of contingencies that can serve as the right basis for value-creation and value-capture prescriptions. We argue that service archetypes based on value propositions are suitable for this purpose. In the third section, we derive and explain five service archetypes that are differentiated in terms of their value propositions. In the fourth and fifth sections, we outline the essential mechanisms for value creation and value capture, respectively, and we show how these mechanisms differ among the archetypes. We then suggest a diagnostic framework for the SCA prospects of service providers. In the final section, we offer a concluding discussion.

Identifying Contingencies Relevant to Strategies of Service Providers

According to the contingency approach,³ no one strategy can be considered optimal for all businesses, regardless of their infrastructure and environmental contexts. The contingency approach suggests that the relation between strategy and performance tends to be conditional, and that no universal set of strategic choices is suitable for all situations and circumstances. As

³ We prefer to use “contingency *approach*” rather than “contingency *theory*.” A theory is a set of assumptions, propositions, or accepted facts that attempts to provide an explanation of cause-and-effect (causal) relationships among a group of observed phenomena (BusinessDictionary.com). One requirement of theory is an ability to test the validity of the assumptions by showing that contradictory assumptions do not disprove the theory (Popper, 1963). If contradictory results are obtained in a contingency framework, the contingency response would either be that the situation is unique or that important dimensions affecting the situation were not tested. Thus, showing that contradictory assumptions disprove the theory is difficult at best. Nevertheless, we view the contingency approach as a useful tool for empirical research.

such, contingency research begins by specifying contingency variables, such as technologies (Thompson, 1967; Woodward, 1958), product characteristics (Stabell and Fjeldstad, 1998), industries (Johnson and Friesen, 1995), customer characteristics (Hunt, 1972), or competitors (Porter, 1980; McGee and Thomas, 1986), in order to categorize internal and external settings so that corporate strategies and organizational structures can be developed based on an analysis of the contingent variables. Strategy only translates into superior performance when contingent variables and strategy are properly matched (Katsikeas *et al.*, 2006). Empirical inquiries adopting a contingency approach usually include three types of variables: contingency variables, managerial-response variables, and performance variables (Zeithaml *et al.*, 1988). The performance variables depend on the first two types of variables—independently and in interaction (i.e., a “fit” measure). As they originate from organizational theory (Woodward, 1958), managerial-response variables have typically revolved around organizational design (Lawrence and Lorsch, 1967; Thompson, 1967) and structure (Mintzberg, 1979; Perrow, 1967). However, as the contingency approach diffused into the realms of marketing (Zeithaml *et al.*, 1988) and strategy (Govindarajan, 1988) other, non-organizational response variables have emerged, such as marketing-mix standardization versus adaptation (Katsikeas *et al.*, 2006) and differentiation versus a low-cost focus (Porter, 1980).

Our identification of a relevant set of contingencies is guided by the resource-based view (RBV, Barney, 1991; Rumelt, 1984). The RBV aims to identify the antecedents of SCA, and to spell out value-creation and value-capture mechanisms. The RBV (including the VRIO framework) is formulated as a generic template. As such, it does not adopt a contingency approach. However, the RBV is useful for our purpose as it lists a number of supply-side factors—resources and capabilities with certain characteristics—that arguably lead to SCA. As we are adopting a

contingency approach, we wish to differentiate these supply-side factors along a set of contingencies. One may view these supply-side factors as managerial responses⁴ to contingencies. As we have supply-side factors on the managerial-response side of this “equation,” it seems logical to have demand-side factors as contingencies on the other side in order to avoid “double counting” and tautological reasoning. This logic limits our search for relevant contingencies, including characteristics of service products, customers, and demand needs, to the demand side. For all three dimensions, we examine characteristics across industries.

Product characteristics: The service-management literature suggests several ways to differentiate the product characteristics of services.⁵ In a general study of service attributes, Contractor et al. (2003) distinguish between knowledge-intensive and capital-intensive service products. Driver and Johnston (2001) distinguish service products on the basis of whether they require interpersonal or non-interpersonal interactions. Berthon *et al.* (1999) differentiate service outputs in terms of the extent of their space manifestations, Ball *et al.*, (2008) distinguish between more and less information-intensive services. One widely used product distinction in the international-business literature focuses on “hard” and “soft” services (Brouthers and Brouthers, 2003; Ekeledo and Sivakumar, 1998; Erramilli, 1990). While the hard/soft distinction is highly

⁴ According to the RBV, the warranted managerial response consists of spotting and acquiring valuable (in an *ex post* sense; see Schmidt and Keil, 2013) resources in the strategic factor market (Barney, 1986), and transforming those resources into firm-specific capabilities that are valuable and inimitable (Barney, 1991).

⁵ For an overview of various distinctions of services and service firms, see Carneiro, da Rocha, and da Silva (2008).

relevant when studying the foreign-operation modes of service firms,⁶ it may be less pertinent for predicting general strategies of service firms.

In one way or another, these product distinctions are indisputably relevant for service providers. However, it is remarkable that they all take a simplistic, dichotomous form. In our introduction, we highlighted a need for few, distinctive contingencies, but two contingencies seems to be below the requisite threshold. Even more compromising for the relevance of this category of contingencies is the fact that none of the mentioned product characteristics are particularly distinct, which suggests that the dichotomies are somewhat arbitrarily defined. For example, the distinction between “hard” and “soft” services is far from clear. Furthermore, product characteristics do not seem to be defined solely by demand-side factors—they tend to imply supply-side factors as well (e.g., factor inputs in the distinction between knowledge- and capital-intensive services). This is not the case with the other two sets of contingencies: customer characteristics and characteristics of service needs.

Customer characteristics: The marketing literature covers a wealth of ways in which customers can be characterized and categorized. For example, customers can be categorized based on lifestyle characteristics (e.g., Plummer, 1974; Kucukemiroglu, 1999). Although this categorization is popular and clearly of practical relevance, it is not well-defined as a general concept. As the various lifestyles are rather indistinct, they do not constitute an operational set of

⁶ As an example, export is excluded as a mode of internationalization for firms offering “soft” services. These firms are confined to using the contractual and investment modes of operation (Erramilli, 1991; Erramilli and D’Souza, 1995; Erramilli and Rao, 1993).

contingencies. Another, conceptually well-established way to differentiate customers is in terms of their purchasing power. For example, bottom-of-the-pyramid (BoP; also known as “base-of-the-pyramid”) thinking, which reconciles aspirations to alleviate poverty and interests in exploiting a burgeoning market, has been highly influential in terms of guiding western firms in their approaches to customers in developing countries (Prahalad, 2004; London and Hart, 2004). In the BoP context, customers are characterized by an extremely low purchasing power of a few dollars per day. The low purchasing power of a large group of people constitutes a contingency factor to which firms respond by assigning their customers to various segments, and by adapting their products and marketing to the needs of each segment. Similarly, the above-mentioned dichotomies of standardization versus adaptation (Katsikeas et al., 2006) and differentiation versus a cost-leadership focus (Porter, 1980; Murray, 1988) may be viewed as responses to customer characteristics (together with other contingencies, such as product characteristics and technology). For virtually all product categories, some customers (not necessarily the poorest) are focused on low prices, content, and standardized products, while others are willing to pay premium prices for customized and/or highly differentiated products. There is little doubt that customers’ price orientations or their focus on product attributes other than price are also relevant contingencies for service providers, even though the bottom-of-the-pyramid view focuses on the basic needs of poor customers, which may pertain more to physical products—food, clothing, and shelter—than to services. Porter’s (1980) generic strategies of cost leadership and differentiation⁷ are also relevant for service providers as responses to customer

⁷ The generic competitive strategies double from two to four when another dimension—the scope of the targeted customer segments—is included. Firms can either target a few, narrow segments or many, industry-wide segments (Porter, 1980).

contingencies. Still, the dichotomous nature of the contingencies limits the extent to which the SCA analysis can be nuanced, which encourages us to continue our search.

Characteristics of service needs: Our search continues through Thompson's (1967) contingency approach to organizational design. Thompson viewed the design of organizations as contingent on three basic technologies—*long-linked*, *intensive*, and *mediating*—and their associated interdependencies. The first technology accommodates manufacturing firms, while the second serves advisory organizations, such as medical clinics and lawyer firms, and the third relates to organizations (e.g., banks, brokers, and insurance companies) that create value by connecting people with shared interests (e.g., lenders and borrowers).

Based on these basic technologies, Stabell and Fjeldstad (1998) formulate three “value-creation logics”—one of which was Porter's (1985) “value chain.” The other two—the “value shop” and the “value network”—applied to service providers rather than manufacturing firms. The thrust of Stabell and Fjeldstad's (1998) study was that basic technologies and the associated value-creation logics had implications not only for organizational design but also for SCA strategies in general. However, the two strategy scholars did not question the nature of Thompson's (1967) technologies. Thompson's basic technologies were primarily defined by their interdependencies (i.e., *pooled*, *sequential*, and *reciprocal*), which clearly had implications for the optimal design of organizations. Hence, the focal “fit” was between technological interdependencies (the contingency variables) and the organizational structure (the managerial response variables). Whereas the three types of interdependencies appear reasonably distinct and well defined, the same cannot be said about Thompson's basic technologies. Thompson did not define his basic technologies by their substance, objects, or artifacts. In fact, the technologies are better described by the customer needs to which they cater. Hence, Stabell and Fjeldstad's (1998) value shop and

value network are good representations of services provided by professional-service firms and network-access firms, respectively, but the two value-creation logics fail to encompass *all* types of service needs. For example, basic service needs, such as transportation, entertainment, and repair and maintenance, are not accommodated. Nevertheless, we suggest that it is possible to define a complete set of distinct service needs, and that these needs may serve as relevant contingencies for the formulation of SCA strategies. In the next section, we suggest such a typology of basic service needs.

Basic Service Needs as Contingencies

Our guiding, deductive principle for deriving basic service needs is that they should be *universal*, i.e. the service needs should apply regardless of technological and institutional changes over time. Consider, for example, the universal character of the advisory and analytical services of a medical clinic. Medical doctors have offered their analytic (clinical) services throughout history based on the same value proposition: the identification (diagnosis) and resolution (treatment) of clients' (patients') problems (diseases). The value proposition remains the same although the services medical doctors provide have improved tremendously thanks to scientific and technological progress, and public regulation. The same liberation from technology and institutions should apply for the other service archetypes as well.

The guiding principle of universality leads us to identify five service archetypes that differ distinctively in terms of the customer needs they cover. These five service archetypes are: (1)

logistics services, (2) facility services, (3) entertainment, (4) network-access, and (5) analytics services. The five types are summarized in Table 1.⁸

--- Insert Table 1 about here ---

The five services types resonate well with the standard classifications of the service sector, although our focus is on the private (and not public) service sector. In the following brief outline of the five basic services we list a number of prominent providers – which, notwithstanding their prominence, may be diversified into other basic service needs.

Logistics services focus on the safe and timely transportation, storage and containment of cargo, data, money, or people.⁹ If we look beyond the technological landscape, the common value proposition made to the customer is moving “something” from A to B (as defined by the customer). Prominent providers of logistics services include such firms as FedEx, Lufthansa, DB, Maersk Line, Shurgard Self Storage, Aldi GmbH, EMC², Vodafone, and PayPal.

⁸ The value proposition of goods production is included in Table 1 as a reference point. As with services, goods production could presumably be divided into distinctively different types based on value propositions. However, as our focus is on service firms, we have lumped goods production into one, very general value proposition.

⁹ With “containment of people,” we are referring to imprisonment or penitentiary “services.”

Facility services center on fulfilling customers' physical needs for food, accommodation, exercise, hygiene, and safety, as well as their repair and maintenance needs related to their property and belongings. Prominent facility-service firms include Johnson & Johnson, the ISS Group, Hertz, the InterContinental Hotel Group, G4S, Securitas AB, McDonald's, and 7-Eleven Inc.

The next basic service type, *entertainment*, revolves around experiences that are stimulating and/or relaxing for the customers. Well-known providers of entertainment services include Cirque du Soleil, the Walt Disney Company, News Corp., Thomson-Reuters, Warner Music Inc., Manchester United, Betsson AB, and Rovio Entertainment Ltd.

Network-access services focus on offering customers access to a network of people or companies with common social and/or economic interests. As such, this is the basic value proposition of the financial sector (e.g., banks, pension funds, mortgage institutions, insurance companies, leasing and factoring companies), as well as of recruitment and dating bureaus, travel agencies, and various brokerage firms (e.g., commodity and ship brokers). Major providers of network services include HSBC, Banco Santander, NASDAQ OMX Group Inc., Allianz, Carlson Wagonlit Travels, Hamptons International, Sotheby's, eBay, Alibaba, Facebook, Twitter, and LinkedIn.

The fifth and final basic type is *analytics services*. This value proposition is about identifying, specifying, and solving client problems. Analytics services are basically the equivalent of "professional services" offered by, for example, law firms, accounting firms, consultants, and architects. Examples of prominent firms that offer analytics services are McKinsey, Tata

Consultancy Services, the WPP Group, DDB, Goldman-Sachs Private Equity Group, and DNV (Veritas).

The five basic service needs make up a *typology* (different from a *taxonomy*), as we have derived the service types on a deductive and conceptual basis (Bailey, 1994) rather than an empirical basis (e.g., through a cluster analysis of observable and measurable characteristics). There is no intrinsic ordering to the five service archetypes, such that the categories are to be considered as nominal, rather than ordinal or interval, scales. The latter two types of scales would have a clear ordering determined, by example, by the extent to which the categories assumed certain attributes (such as a continuum from hard to soft services).

It is worth noting that different service types can be found in one and the same service industry. Take the retail industry as an example. In this industry, logistics services, facility services, and entertainment services are offered by, respectively, factory outlets, convenience stores, and luxury goods boutiques. Conversely, a service archetype, such as logistics, is not confined to one service industry or sector (e.g., “transportation”). Rather, it can be found in a range of industries, including the telecommunications industry (in the form of data transmission), the banking industry (money transfer), and the IT industry (cloud services).

In the next two sections we discuss the essential sources of SCA for each of the five basic service types. The discussion falls in two parts inasmuch as SCA usually is seen as a duality of value creation and value capturing, see, for example, C. Bowman and V. Ambrosini (2000). We start with the definition, discussion, and exemplification of value-creating essentials.

Value-creation Essentials

We define value-creating essentials as those mechanisms that are imperative for a firm's enhancement of customer satisfaction and through which the value-creating firm earns an economic rent when competition is limited.

The primary value-creation essentials of *logistics services* are scale and scope advantages. Logistics is a matter of capacity utilization. For example, a fleet of trucks should be used efficiently and not left idle, scheduled to load and unload for customers dispersed over a wide area, or driving around half empty. The same applies for a fleet of vessels, although an important difference between land and sea freight is that opportunities for enlarging vessel size are only restricted by port and channel dimensions. Consider, for example, the introduction of the new "Triple E" class container ships, which carry more than 18,000 TEU (twenty-foot equivalent unit) containers. The name Triple E is derived from the class's three design principles: economy of scale, energy efficient, and environmentally improved. The depth (48 feet) and width (194 feet) of these new, giant vessels imply that only deep-water ports with tall cranes with a wide reach are able to service them. On the other hand, the Triple E ships offer unprecedented economies of scale in terms of materials, manning and, not least, fuel consumption.

The value-creation essentials of *facility services* are about human resource management (HRM)—the recruitment, training, motivation, and retention of personnel. Motivated employees are easier to retain, and low staff turnover means cost savings on recruitment and training, which is a critical competitive factor for labor-intensive services for which attrition rates are often high. Hence, for some facility-service companies that rely on low-skilled labor (such as cleaning companies) attrition rates are well above 100%. Through a long and dedicated HRM effort the multinational facility-services provider, ISS, has managed to increase the average employment period of its low-skilled staff (of several hundred thousands) from six to nine months (Pedersen

and Petersen, 2012, and personal communication) through a long and dedicated HRM effort. Such an achievement has a substantial positive effect on the bottom line. The multinational fast-food restaurant chain, McDonald's, serves as another good example of the essentiality of HRM in the value-creation process. The sustained success of the company is usually ascribed its strong brand, but it is worth noting that McDonald's is often second to none in best-place-to-work rankings in many of the countries in which it operates. McDonald's ability to induce team spirit and associate professional pride with what might look like rather mundane or trivial jobs is remarkable.

The value-creation essentials of *entertainment* are also related to HRM, but they are applied to a much different clientele. In this regard, we highlight three essentials. The first is HRM's ability to spot and develop artistic and/or physical talents among individuals. An entertainment provider must employ individuals with unique artistic, sporting, or creative talents. However, a classic problem among these service providers is that the employed "stars" are usually perfectly aware of their market value and will appropriate that value to its full extent. It is therefore preferable to spot and develop talents among potential stars rather than compete with other entertainment firms to hire well-known stars. Hence, abilities related to talent spotting and talent development serve as an important source of competitive advantage. For example, some professional soccer clubs, such as Ajax Amsterdam and FC Barcelona, are recognized for their youth-development programs. Another example from the sports sphere is Oakland Athletics' successful use in the early 00s of analytical and evidence-based methods, "sabermetrics", to spot undervalued players (Lewis, 2003). Despite having the third-lowest team payroll in the Major League Baseball (MLB) in 2002 general manager Billy Beane's rigorous statistical approach challenging conventional baseball wisdom brought Oakland A's to the playoffs this and the following year.

The second essential is HRM's ability to create a work environment in which the employees' creative abilities come into play. One famous example in this regard is Pixar Animation Studios in San Francisco, which has used computer-animated imagery technology to produce a string of artistically and commercially successful movies, including the *Toy Story* and *Cars* films. Throughout the 1990s and 2000s, Pixar gradually developed the "Pixar Braintrust"—the studio's primary creative-development process in which all directors, writers, and lead storyboard artists at the studio look over each other's projects on a regular basis and provide candid "notes" (the industry term for constructive criticism) on those projects. The Pixar Braintrust operates under a philosophy of a "filmmaker-driven studio" in which creative individuals help each other move their films through a process somewhat like peer review, as opposed to the traditional Hollywood approach of an "executive-driven studio" in which directors are micromanaged through "mandatory notes" from development executives who rank higher than producers (<http://en.wikipedia.org/wiki/Pixar>, accessed October 30, 2014).

The third essential relates to the visionary capabilities of the managers (rather than HRM capabilities), especially the service provider's ability to anticipate or even create new trends and fads. John Lasseter, co-founder of Pixar and an executive producer, possesses such a capability, as did the Beatles' music producer, George Martin, in contrast to Decca's Mike Smith who turned down the Beatles, stating that "guitar groups are on the way out" and "the Beatles have no future in show business" (The Beatles, 2000). Another example, found in the gourmet restaurant business, is René Redzepi, the chef and co-founder of NOMA, which is currently considered to be the best restaurant in the world. NOMA (the name is an abbreviation of "Nordic food" in Scandinavian languages) foresaw and co-created a new trend of using local (Nordic) ingredients in untraditional combinations.

With regards to *network-access services*, we suggest the presence of two value-creation essentials. The first essential is buyer/supplier screening and segmentation capabilities. A provider of network-access services needs screening capabilities to avoid adverse selections that might compromise the value of the network access (Akerlof, 1970; Cawley and Philipson, 1999). For example, the online market places eBay and Alibaba both enforce strict regulations regarding sellers and buyers who do not live up to the auction sites' rules and ethical codes. Without systematic exclusion of such participants, the honest users would soon find other, more trustworthy intermediaries. In online sales, the elimination of uncertainty is an imperative competitive factor. The second essential is the capacity to ensure network externalities (Katz and Shapiro, 1985; Shapiro and Varian, 1999). Network externalities are usually described as economies of scale generated on the demand side—the value of the service (the network access) for each customer increases as the number of other customers using the service (the network) rises. *Ceteris paribus*, a large, worldwide network is more valuable to the individual customer than a small, local network. eBay and Alibaba both hold near monopolies in their parts of the world simply because they have obtained more network externalities than other online auction sites. The social and professional networks of YouTube, Twitter, Facebook, and LinkedIn are also strong, uncontested market leaders in the western world within their individual domains—again as a result of network externalities.

The value-creation essentials of *analytics services* revolve around the possession and combination of domain and client knowledge. Competencies, rather than capacity, constitute the essential resources. The service provider must possess domain-relevant expert knowledge, analytical skills, and a thorough knowledge of clients' preferences and routines. Although they do businesses in different worlds, the providers of analytics services and entertainment have a

common need to identify and recruit the “best-in-class” candidates. For example, Indian Evalueserve, a provider of business and technology research, data analytics, and investment-research services to companies worldwide, recruits from among the best candidates from the best management and engineering schools in India and elsewhere. This means that, in the Indian context, it focuses on very small fraction of the total pool of potential candidates (<http://www.evalueserve.com/>, accessed October 31, 2014). In the global market, McKinsey & Company is typically regarded as the most prestigious (and most expensive) management-consulting firm, but contenders may still maintain a competitive advantage by possessing specialized, “niche” knowledge and by focusing on their deeper knowledge of local businesses.

The above outline suggests that the five basic service needs are quite distinct in terms of the service archetypes with which they are associated. In other words, there is very little, if any, overlap in the value-creation essentials of the various service archetypes. In the next section, we examine whether this is also the case with value-capture essentials.

Value-Capture Essentials

The value-creation essentials constitute necessary *but not sufficient* conditions for a firm—in this case, a service provider—to achieve a sustainable competitive advantage. A *sustained* competitive advantage requires mechanisms that isolate (Rumelt, 1984) the firm’s value creation

against expropriation by competitors.¹⁰ Hence, we define *value-capture essentials* as those mechanisms that help to limit the competition faced by the value-creating firm.

The value-capture essentials of *logistics services* take two forms. The first relates to the scale and scope advantages indicated as value-creation essentials. For example, a logistics service provider may prevent competitors from expanding in the market through investments in pre-emptive capacities (e.g., Ghemawat, 1984). The excess capacity deters rivalries from making similar capacity investments to the extent that such investments are deemed unprofitable. Maersk Line's investment in a new fleet of Triple E class container ships may be an example of such preemption. To the extent that Maersk Line was the first shipping company to invest in these highly cost-efficient container ships, it was likely to achieve first-mover advantages (Lieberman and Montgomery, 1988). The second value-capture essential is the obtaining of concessions. In particular, when a logistics service takes on the characteristics of a "natural monopoly," governments become prone to making that service concessional. Postal services, telecommunications, ferries, and air and rail transportation have traditionally been provided on a concessional basis, although the general trend towards market liberalization and deregulation is challenging these concessions.

The value-capture essentials of *facility services* are reputation and branding. As entry barriers are usually low in the facility-services industry, consumers face a high risk of being cheated by

¹⁰ We are aware that the existence of "isolating mechanisms" against competition constitutes a necessary but *insufficient* condition for SCA. The created value may be expropriated by parties other than competitors, including customers, suppliers, governments, competitors, or the firm's own employees. Given our space limitations, we do not discuss isolating mechanisms in relation to these stakeholders in this paper.

incompetent entrants. However, reputation and branding can mitigate such risks. Branding eliminates consumers' perceived uncertainties in two ways. First, consumers associate the brand with their previous purchases of products from the same brand and make inferences of similar (high) quality standards. Second, consumers assume that a facility-service provider owning a valuable brand is unlikely to put that asset at risk. Therefore, they do not consider the potential for freeriding or they expect full compensation from the provider if the service fails to meet expectations. The previous example of McDonald's applies as an illustration of these mechanisms.

The example of Pixar Animation Studios is well-suited for illustrating the value-capture essentials of *entertainment* providers. Pixar (part of the Disney Company since 2006) protects its movies against imitation through copyrights. This is fairly straightforward. However, it is considerably more difficult to protect the company's most important strategic assets—the many creative people it employs. How does Pixar keep competitors from headhunting its employees? As the use of competition clauses is restricted by labor-market regulations, Pixar must rely on its organizational principles and team spirit (“the legacy of John Lasseter”) to retain its creative individuals. Moreover, to the extent that the talent of the individuals is embodied in the Pixar team, its value would be significantly lower when deployed by competitors. Hence, the other value-capture essential is the entertainment provider's ability to “contain” the talent of its employees in teams. Whereas Pixar Animation Studios seems to be an exemplar of a company (though now a Disney Company affiliate) that is in possession of both value-creation and value-capture essentials, general manager Billy Beane and his Oakland Athletics may do as an example of an entertainment provider that developed value-creation essentials through adoption of

sabermetrics but failed to capture this value in as much as other MLB managers were able to copy Beane's use of sabermetrics as an analytical tool for spotting undervalued baseball skills.

With regard to the value-capture essentials of providers of *network access*, we point to authorization and consumer switching costs. For example, the establishment of certain networks, such as insurance and banking networks, requires government authorization. Social-network firms, like Facebook and Twitter, do not need such authorization, but network externalities have given them near-monopoly positions in the western world. For these social-network firms, network externalities serve a dual function as essentials for value creation and essentials for value capture. The isolating properties that seem to characterize network externalities are amplified by considerable consumer switching costs.

Switching costs are also value-capture essentials for providers of *analytics services*, as bonding with clients is the isolating mechanism *sine qua non*. The bonding *can* be social, but equally or more important is bonding by developing a common body of knowledge and shared communication routines. Certification of the service (e.g., by medical doctors, lawyers, and accountants) is the other value-capture essential.

As with the value-creating essentials, these isolating mechanisms appear to be fairly specific to one of the five service needs. However, there is some overlap with regard to concessions, authorizations, and certifications. Furthermore, we have not mentioned continuous innovation (Weston, 2001) or inter-firm causal ambiguity (King, 2007) as safeguards against competitors' imitation. Nevertheless, one may argue that to varying degrees are innovation and causal ambiguity relevant as isolating mechanisms for all five service archetypes.

In this outline of value-capture essentials, we have not mentioned continuous innovation (e.g., Weston, 2001) or inter-firm causal ambiguity (e.g., King, 2007) as safeguards against competitors' imitation. Nevertheless, innovation and causal ambiguity are relevant as isolating mechanisms for all five service archetypes to varying degrees. Causal ambiguity and innovation are definitely essentials for providers of entertainment. One could also argue that causal ambiguity is an important ingredient in the HRM practices of facility-service providers and in analytics-service providers' efforts to bond with clients.

As with the value-creation essentials, these isolating mechanisms appear to be fairly specific to one of the five service archetypes. However, there is some overlap with regard to concessions, authorizations, and certifications.

Table 2 summarizes the essentials of value creation and value capture for the five service archetypes.

--- Insert Table 2 about here ---

A Diagnostic Framework for the SCA Prospects of Service Providers

The above juxtaposition of five service archetypes with particular value-creation and value-capture essentials prescribes a certain strategic fit between the focal service demand (the value proposition) and the resources possessed by the service provider. A service provider should be able to use these insights to check whether it is realizing a strategic fit between the service provider's value propositions and its possessed resources. However, what if this check reveals a *lack of fit*? Should the service provider reconfigure its resources (i.e., change its capacities and

capabilities), redefine its value proposition(s), or both? If it takes both steps, the service provider will basically define a new business model.

In the previous two sections, we indicated the implications of strategic fit for service providers—the value essentials for various service archetypes. However, we cannot advise the service provider as to whether it should achieve this fit by redefining its value proposition(s), reconfiguring its resources, or both. We are limited to putting these different ways of achieving a strategic fit into a diagnostic framework for SCA prospects, which we present in Figure 1.

--- Insert Figure 1 about here ---

The two dimensions of the framework—a service provider’s value proposition(s) and its resource configuration—echo a contingency approach, as the value proposition(s) captures the contingency (contingencies) along which a service provider configures its resources. In other words, service providers can make value propositions in relation to one or more of the five universal service demands, which can be viewed as constituting stable and unchangeable “environments.”

In summary, the diagnosis should establish whether a service provider is realizing a strategic fit between its current value proposition(s) and its resource configuration—the capacities and capabilities deployed by the service provider.

Let us consider an example that illustrates how a strategic-fit diagnosis may proceed. A retail bank offers three basic value propositions to its customers. First, it provides access to a wide (although not world-wide) network of lenders and borrowers on behalf of which the bank clears liquidity surpluses and deficits. Second, the bank offers logistics services—it facilitates the transfer of money from its customers to their designated recipients. Third, the bank offers advice (analytics services) to its clients regarding the best investments and loans. It also provides clients with an overview of their finances and disposable income. However, the bank is now experiencing a new situation: networking companies, such as Google and Alibaba, are extending their service offerings into banking by offering payment and loan services to private (household) customers. Due to their larger, worldwide networks and concomitant superior network externalities, the social network companies are able to outcompete the bank on these services. In response, the bank redefines its value propositions, putting more emphasis on its advising and analytics services. In order to do so, the bank cuts down on the number of staff dealing with payment services (and retains only its Internet-based self-services) and on the number of staff handling loans to households. At the same time, the bank expands the number of financial analysts in order to upgrade the advisory services offered to corporate clients and to private investors with substantial assets. Hence, in simultaneous actions, the bank reconfigures its resources (hiring and laying off staff members) and redefines its value propositions. In effect, the bank develops a new business model (see the lower-right quadrant in Figure 1), which implies a transformation from a retail bank to an investment bank.

Take a local discount supermarket as another example. The supermarket offers its customers low-priced groceries. The owner of the supermarket has managed to hold operating costs in check by maintaining a limited product assortment and minimum inventories (occasionally

resulting in empty shelves), and by providing himself and his employed family members with only modest pay. One day, the Aldi retail chain announces it will soon open a discount outlet next door. Through its scale and scope advantages, Aldi will assume cost leadership relative to the existing, local supermarket, and the local owner realizes that his supermarket will be outcompeted in terms of cost-efficient logistics. He also realizes that in order to survive, he has to switch from offering basic logistics services—making groceries available to customers in the cheapest possible way—to offering facility services and, if possible, entertainment. As a consequence, the owner of the local supermarket takes several steps. First, he renovates the store’s interior to look inviting and intimate (in contrast to Aldi’s austere interior). Second, he introduces a range of local, mainly organic food specialties and invites the producers themselves to present them to the customers using a shop-in-shop concept. Third, he educates himself and his family employees in delivering personalized, warm, and knowledgeable customer service. In other words, the local supermarket transforms from offering basic logistics services to facilitating and entertaining the customers while they handle their daily grocery shopping. In Porter’s (1980) vocabulary, the supermarket replaces its cost-leadership strategy with a focused differentiation strategy. The transformation also echoes the “wheel of retailing” model (e.g., Hollander, 1960), which describes an evolutionary development of retailers from low-margin businesses targeting cost-focused customers to high-margin enterprises appealing to more quality- and luxury-oriented customer segments. The supermarket example serves as another illustration of a redefinition of the value proposition combined with a reconfiguration of resources.

We can easily change the two examples to illustrate situations in which the service provider only redefines its value propositions or reconfigures its resources (respectively fitting the upper right and lower left quadrants in Figure 1). For example, the retail bank may decide to completely shut

down its money-transfer services and continue its usual activities in relation to savings, loans, and advisory services. Similarly, the local supermarket owner may choose to stick to the present value proposition and reconfigure the resources (e.g., by narrowing the product range even further) with the aim of matching Aldi's logistics in terms of cost efficiency.

Our diagnostic framework does not necessarily imply changes. Companies that observe competitors with apparently perfect strategic fit (the upper left quadrant in Figure 1) and want to emulate that fit can use the framework as a reality check or as a benchmarking tool.

Conclusions

In this paper, we have promoted the basic view that services are more than just the opposite of manufacturing. In reality, service providers may differ fundamentally in terms of the basic needs they are fulfilling and in terms of the resources (capacities and capabilities) they must possess in order to fulfil those needs in a profitable way. If we only differentiate services on the basis of their dissimilarity with manufacturers (i.e., by the service characteristics of intangibility, heterogeneity, perishability, and simultaneity between production and consumption), we risk missing strategically important factors. Moreover, a reliance on conventional industry classifications of services—such as banking, retailing, and facility management—carries a serious risk that strategic imperatives will be overlooked. Extant discussions of servitization (see, e.g., Kastalli, van Looy, and Neely, 2013, and Suarez, Cusumano, and Kahl, 2013), as a turnaround strategy for many manufacturing firms therefore appear to be rather simplistic, as the service component is usually viewed as merely a matter of (more) repair and maintenance. Other

service logics—especially those related to logistics, network-access, and analytics services—deserve careful consideration as key elements of a firm’s servitization strategy.

We have highlighted the essentials of value creation and value capture as important components in the formulation and development of business models. For the practice-oriented company manager, the understanding and development of a competitive business model is a *sine qua non*. The situation is different for the researcher, for whom business models are—and should be—unique for each company. If the business model is not unique, it is unlikely to be competitive. As such, it is difficult to generalize and theorize about (successful) business models, as they tend to be idiosyncratic and firm specific. Moreover, business models are difficult to grasp because they embrace all aspects of a firm’s business operations. From this perspective, some broad and universal categories of service offerings may constitute general starting points for understanding and developing business models. As such, they may appear to be useful strategic-analysis tools for researchers as well as practitioners. In addition, the business-model concept tends to be technology oriented with a special focus on digital-technology business opportunities. Much of this focus has historical origins, such as the dot.com wave. In this paper, we have tried to avoid this “technological myopia” by categorizing services on the basis of universal characteristics that apply across institutions and technologies.

While the formulation of broad, universal categories of service offerings is appealing, we are also aware that such a categorization suffers from some ontological as well as methodological weaknesses. In ontological terms, it is difficult, if not impossible, to establish that there are only five archetypes of service offerings. The reader may question whether these categories fulfil the scientific typology ideals of exhaustiveness and mutually exclusivity. If this is not the case, the ability of the service categories to explain and predict corporate strategies is weakened.

However, our service categorization seems useful given the lack of tools for strategic analysis that has thus far characterized services research. The methodological weakness of our categorization has to do with the fact that service providers often make value propositions related to more than one service category. This complicates the use of industry statistics to make inferences between firms' value propositions and their behavioral or structural patterns (e.g., international growth, governance structures), and suggests that the unit of analysis is not the individual firm but rather the firm's current or potential value propositions.

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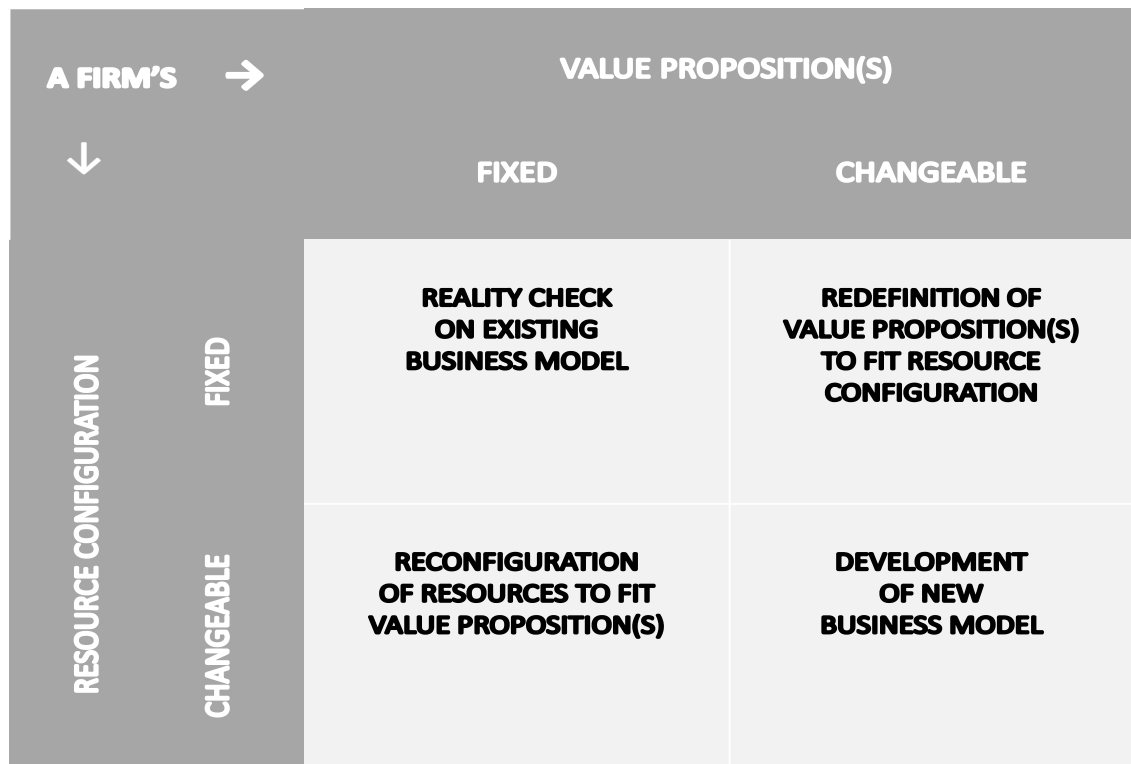
Table 1: Basic service types

SERVICE TYPE	BASIC SERVICE NEED / VALUE PROPOSITION	EXAMPLES OF PROMINENT PROVIDERS
LOGISTICS SERVICES	Safe and timely transport or storage of goods, equipment, data, money and persons	FedEx, Lufthansa, DB, Maersk Line, Shurgard Self Storage, EMC ² , Aldi, Vodafone, PayPal
FACILITY SERVICES	Safeguarding, maintaining and facilitating the use of goods and properties	Johnson & Johnson, Hertz, the InterContinental Hotel Group, G4S, Securitas, McDonald's, 7-Eleven
ENTERTAINMENT	Giving the client experiences that are exciting, stimulating and/or relaxing	The Walt Disney Company, FC Barcelona, News Corp, Warner Music, Betsson, Rovio Entertainment
NETWORK ACCESS	Giving access to networks of individuals & firms sharing economic or social interests	HSBC, NASDAQ OMX, Allianz, Carlson Wagonlit Travels, Hamptons Int'l, eBay, Facebook, LinkedIn
ANALYTICS SERVICES	Identifying clients' needs or problems and giving advice to their fulfilment/solution	McKinsey, the WPP Group, DDB, Goldman-Sachs Private Equity Group, DNV (Veritas)

Table 2: Value-creation and value-capture essentials for different service types

SERVICE TYPE	VALUE-CREATING ESSENTIALS	VALUE-CAPTURING ESSENTIALS
LOGISTICS SERVICES	Scale and scope advantages	Concessions and preemptive scale & scope capacity
FACILITY SERVICES	Ability to upgrade and professionalize human resources	Reputation and branding
ENTERTAINMENT	Ability to spot and develop artistic and/or physical talent at individuals	Copyrights and team-embodied talent
NETWORK ACCESS	Buyer/supplier screening & segmentation capabilities plus network externalities	Authorization and consumer switching costs
ANALYTICS SERVICES	Possession and combination of domain and client knowledge	Certification and bonding with clients

Figure 1: A diagnostic framework



Emotion measurement services for knowledge workers

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In order to understand and manage how emotions affect knowledge work, organizations need proper tools to become aware of emotions. Measuring emotions is an approach to consider. In this paper, three different emotion measurement services are tested: daily experience survey, electrodermal activity ring and self-tracking of emotions. The paper provides new insights and user experiences of emotion measurement services and their applicability in daily knowledge work. Managerial guidelines are drawn up for planning and executing emotion measurement in an organization for two purposes – supporting self-development and assessing company pulse.

1. Introduction

Employees' moods and emotions have been recognized as important assets in organizations as they influence various outcomes, such as satisfaction, creativity, motivation and overall job performance (Brief & Weiss, 2002; Barsale & Gibson, 2007; Totterdell & Niven, 2014). The role of emotions in organizational life started gaining growing interest in the 1990's (e.g. Fisher and Ashkanasy, 2000). Hochschild's (1983) seminal work 'The Managed Heart' opened the path for researching emotions in organizational settings and the impetus for popular interest was given by Daniel Goleman's (1995) book 'Emotional Intelligence'. The book has made an impact on managers and employees worldwide, and the ability to use emotional information to guide thinking and behavior has become a valued skill ever since.

Specific topics in current emotion research in organization and management science include state and trait affect and mood, discrete emotions, the affective circumplex, affective events theory, emotional intelligence, emotional labor, emotional contagion, emotions and leadership, and building a healthy emotional climate (Ashkanasy & Humphrey, 2011; Barsade & Gibson, 2007). Service literature has been interested especially in studying emotions in the contexts of service experience, customer behavior during service failure and recovery as well as emotional labor and coping of service workers (Grandey et al., 2004 Schoefer & Diamantopoulos, 2008; Groth & Grandey, 2012; Strizhakova et al., 2012). There is, however, a need for more research at individual (within person) level and also taking context more into account (Gooty et al., 2009; Ashkanasy & Humphrey, 2011).

In order to make good use of emotions in workplaces, they need to be better understood and identified. One practical way for doing so is to start measuring emotions. There is a research stream that is interested in measuring emotions and their behav-

ioral outcomes at work (Payne, R., 2001; Gray & Watson, 2007; Mauss & Robinson, 2009; Scherer, 2005; Warr et al., 2014). The measurement approaches are varied, including, for example, general job satisfaction and emotion related surveys and self-reporting tools, experience sampling methods, diaries as well as physiological measures (Barsade & Gibson, 2007). Technological development has provided new practical tools and measurement services (such as wearables and mobile applications) for employees and managers that are relatively cheap and easy to take into use, but their applicability still remain uncertain.

The purpose of this paper is to find out how emotions can be measured in knowledge work context and evaluate the applicability of three different technology-based emotion measurement services. With the analysis of user feedback, the paper sheds light on what kind of role different emotion measurement services could play in knowledge worker's personal well-being and furthermore productivity. The focus of the study is on daily work experiences including momentary moods and discrete emotions. Moods and emotions are seen as important signals that affect, and at their best, benefit knowledge work performance. The paper provides new insights and user experiences of emotion measurement services and their use in knowledge work. Further, managerial guidelines are drawn up for planning and executing emotion measurement services in an organization.

2. Measuring emotions in knowledge work context

2.1. Emotions as important assets of knowledge work performance

Knowledge work productivity and performance development are stated to be the most critical management challenges of the 21st century (Drucker, 1999; Davenport, 2008). Work performance can be seen as a multidimensional concept, including task performance, contextual performance (or organizational citizenship behavior, OCB) and counterproductive work behavior (CWB) (see, e.g., Koopmans et al., 2013). Creative performance is also one important approach in knowledge work context as knowledge workers are expected to engage in continuous innovation and learning (e.g., Drucker, 1999). Despite all efforts and methods used by the organizations and managers, knowledge work performance results from "the constant interplay of perceptions, emotions and motivations triggered by workday events" (Amabile & Kramer, 2007). Therefore, emotions play crucial role when developing performance and they should be included in performance development projects and performance assessments.

Employees' moods and emotions can influence a variety of critical performance-related outcomes including judgements, creative problem solving, motivation, helping behaviors, risk taking, general performance, negotiations, relationships as well as counterproductive and withdrawal behavior (Brief & Weiss, 2002; Barsade & Gibson, 2007; Totterdell & Niven, 2014). Emotions can be classified into positive and negative emotions and usually it is assumed that positive emotions lead to positive behaviour and all negative emotions need to be eliminated. However, the links between

emotions and performance are more complex - various studies have shown also the differences between the activation level of emotions, the benefits of negative emotions as well as the drawbacks of positive emotions (e.g., Warr, et al., 2014; Spector & Fox, 2010; Lindebaum & Jordan, 2014; George & Zhou 2007, George & Zhou, 2002). In order to better understand emotions in workplace, the concepts of emotions and mood are discussed in this chapter.

Emotion is a wide concept that is difficult to define. There exists a broad diversity of different definitions of an emotion - for example, Kleinginna & Kleinginna (1981) discovered more than 100 definitions over 30 years ago. Although emotions are an inseparable and crucial part of human life, the specification of the concept is problematic. It has been challenging to reach consensus among scientists (Scherer, 2005). Some definitions emphasize how emotions are build up with different components such as physiological response, appraisal and expression of emotion (Totterdell & Niven, 2014). According to Gooty et al. (2010), definitions range from neurophysiological components to physiological changes, to reactions to events and from feelings in a certain way to mood states.

Emotions can be defined by component processes. According to Scherer (2005), emotions as component process models are reasonably common today and the component process model definition is gaining increasing acceptance. The component process model by Scherer (2005) describes emotions as following five components (1) Cognitive component (appraisal) (2) Neurophysiological component (bodily symptoms) (3) Motivational component (action tendencies) (4) Motor expression component (facial and vocal expression) (5) Subjective feeling component (emotional experience).

Emotions are thus driven by appraisals of the stimulus events and manifested by different expressions. As Scherer (2005) explains, "this seems rather obvious as we do not generally get emotional about things or people we do not care about." A similar component view is presented by Hochschild (1990): emotion is an awareness of four components (elements) that are typically experienced simultaneously (at the same time). These elements include (1) appraisals of a situation (2) changes in bodily sensations (3) the free or inhibited display of expressive gestures (4) a cultural label applied to specific constellations of the first three elements. Also according to Totterdell & Niven (2014), emotions are comprised of several components. A discrete emotion consists of components such as phenomenological "feeling", physiological activation, action tendency, cognitive appraisal and external expression.

When it comes to explaining structure of emotion, scholars are typically separated into two groups: those who prefer to use models such as the circumplex model and those who place emotions into separate categories. (Totterdell & Niven, 2014) In the circumplex model, emotions and moods are identified by two dimensions: valence and arousal. The horizontal axis represents thus the positive or negative valence of an emotion. This means, whether an emotions feels good or bad ie. pleasant or unpleasant. The vertical axis describes the amount of arousal of an emotion, in other words how energetic or active one feels. (Yik et al., 2011) For example calmness is high in pleasure, but low in activation (Totterdell & Niven, 2014).

The other way to model the structure of emotion is to classify emotions into discrete categories. These categories contain only "irreducible basic emotions from which more complex emotions are derived". (Totterdell & Niven, 2014) According to Ekman

& Cordaro (2011), “there is evidence for universality in the following seven emotions”: anger, fear, surprise, sadness, disgust, contempt and happiness.

Emotions are a very complex phenomenon. According to de Sousa (2014), emotions alter in several dimensions, for example in intensity, expression and object-directedness. Emotions are multidimensional, not just inner states or processes, but shaped in interactions, understandings and valuations (Sieben & Wettergren, 2010). What makes emotions more complex is that they are context-specific. How an individual reacts to a particular event may depend on the context: alone at home versus in a group or at work. (Zerbe et al., 2008) Also individuals vary in terms of how they experience emotions, as people evaluate events differently (Totterdell & Niven, 2014).

Emotions and moods are closely connected (Cropanzano et al., 2003). The most essential distinction between emotions and moods is diffuseness — “Emotions are always about something or someone” (Cropanzano et al., 2003), whereas moods lack this kind of an object or defining event (Forgas, 2011; Scherer, 2005; Cropanzano et al., 2003). Thus, there seems to be consensus in the scientific community that emotions are caused by specific events. (Totterdell & Niven, 2014; Scherer, 2005; Ekman & Cordaro, 2011; Nyklíček et al., 2010; Cropanzano et al., 2003). Often this event is evaluated as significant, as we don’t usually “get emotional about things or people do not care about” (Scherer, 2005).

Other distinctive factors of emotions and moods are intensity and duration. Moods are low in intensity (Scherer, 2005; Forgas, 2011) and relatively long in duration (Totterdell & Niven, 2014; Forgas, 2011), lasting from hours to days (Scherer, 2005). Moods are more typically more enduring than emotions (Forgas, 2013; Scherer, 2005). However, Cropanzano et al. (2003) state that emotions can be long in duration as well – people have a tendency to keep those “emotional states active by rumination”. To sum up, emotions can be distinguished from moods in three ways: they are shorter in duration, more intense and always directed to a specific object (Totterdell & Niven, 2014).

2.2. Approaches to measure emotions in workplace

We assume that emotions have not yet been sufficiently taken into account when organizations try to figure out the state of well-being and performance at work. There are several inquiries concerning the well-being and performance, but much more emphasis should be laid on the emotional life of the employees. Emotional data can at its best be a proactive indicator in well-being. When emotional activity from certain periods of time is seen in real time, it can help to recognize the need for recovery (before burnout). For example, the follow-up of sick leaves is reactive rather than proactive, as it measures the consequences of burdening periods of work. There is a need for more real-time measuring of emotional well-being and performance than just the yearly well-being or performance enquiries. For example, companies have been questioning the conventional backward-looking assessments and applying quarterly or per-projects “performance snapshots” and weekly check-ins instead (see e.g. Buckingham & Goodall, 2015).

There are various different methods for measuring emotions in workplaces, for example, general job satisfaction and emotion related surveys and self-reporting tools, experience sampling methods, diaries as well as psychophysical measures (e.g., EEG signals, skin conductance, heart rate) (see Barsade & Gibson, 2007; Payne, 2001; Mauss & Robinson, 2009; Scherer, 2005). These measures include different emotion components and measures different emotional responses, including, subjective experience, physiological response (autonomic nervous system and central nervous system) or behavior (Mauss & Robinson, 2009). Moods and feeling are also included in subjective well-being surveys, such as job satisfaction, stress or work engagement (see, e.g., Salanova et al., 2014). These surveys, however, usually measure feelings in long duration, not short or medium term moods and discrete emotions which are in focus in this study. Emotional intelligence measures, on the other hand, assess personality or ability (Conte, 2005), not moods and emotions as such.

A widely used solution to measure emotions is different kinds of self-reporting tools, such as surveys. Measurement can, for example, emphasize positive and negative affect (or activation to be precise), with the PANAS Scales (Watson et al., 1988; Thompson, 2007) or take more dimensional model, such as circumplex model, into account using a 12-Point Affect Circumplex (12-PAC) scales (Yik et al., 2011). Scales to measure emotion at the workplace include Job-Related Affective Well-Being Scale (JAWS) and Multi-Affect Indicator (Warr et al., 2014). These previously mentioned surveys include both context free (i.e., “I was happy”, “I felt tense”) and job-related scales (“My job made me feel anxious”).

Psychophysical methods to measure emotions aim to capture the activation in the body’s autonomic nervous system (ANS). Emotions arouse activity in ANS which can be seen in increases in, for example, skin conductance response (electrodermal activity), blood pressure, heart rate and heart rate variation. The higher and more intense the emotional arousal is, the higher is the activation in the autonomic nervous system as well. (Totterdell & Niven, 2014) Previously electrodermal activity has been used mostly in laboratory setting, now these new tools (such as wearable technology) have made it possible to conduct measurements in real life context for a longer time period. However useful these measurement tools are, they do not cover all aspects of emotional life. As emotional responding can be measured in various ways and different measures complement each other, Mauss & Robinson (2009) suggest that experiential, physiological, and behavioral measures are all relevant to understanding emotion.

Emotional data of the employees have many potential possibilities of utilization: supporting individual’s abilities to perform and recover from stressing periods. One can also learn to utilize and manage some discrete emotions (e.g. anger, frustration) in a better and more sustainable way. Measuring emotions can at its best bring awareness to issues that would otherwise be hidden. For example, measuring skin conductance reveals the emotional activity – be it positive or negative. This can shed light into how emotionally burdening period one has had at work, perhaps even unconsciously. Understanding this, one can make the corrective actions to support recovery.

3. Empirical examination

3.1. Research methods and data collection

Three emotion measurement services were tested by knowledge workers in real life work contexts. These services provided new ways to collect data of daily work and acted as personal development tools for workers at the same time. The usefulness of these services was tested through piloting services in small groups. The selected services approached emotion measurement with quite different approaches; web-based 'human intelligence' service was used for reporting daily subjective emotional experiences at work, wearable technology ring measured electrodermal activity during workday and mobile self-tracking service was utilized for identifying discrete emotions and their intensity. By utilizing various types of measurement approaches that consist of different emotional components, it is possible to gain more comprehensive view on employee's emotions. Feedback was gathered after each research period using interviews, diary reports or a questionnaire. Table 1 summarizes the measurement approaches and data collection methods.

Table 1. Measurement approaches and data collection methods

<i>Measurement approach</i>	<i>Type and component of emotion</i>	<i>Research period</i>	<i>Participants for pilot tests and feedback</i>
Daily experience survey	Subjective emotional experience: valence and activation	Twice a day during the first intensive week Once a week for 11 weeks Once a day during the second intensive weeks	22 responded survey in one company 10 interviews for collecting feedback
Electrodermal activity during working	Emotional intensity - Arousal, activity	Five days	8 participants, daily reports
Identifying and labeling emotions	Subjective emotional experience: Amount and intensity of discrete positive and negative emotion	Five days	8 participants, a questionnaire after research period

The daily experience survey was carried out in a small knowledge intensive organization. The daily experiences were monitored within different periods of time. There were a two-week's intensive measurement period when the respondents answered

first two times a day and then once a day during second intensive week. Emotional data was also collected as continuous monitoring once a week between the intensive weeks. The survey included five questions or statements. Two emotion measures included activation and valence. The knowledge workers were asked to rate their daily experience on scale 1 to 100 as follows: “What is your energy level? (ranging from unactivated to activated)” and “How are you feeling? (ranging from unpleasant to pleasant)”. The other statements were measuring progress, workload and overall job performance. The web-based ‘human intelligence’ service (Celkee Insights) was used for collecting the data. E-mail reminder was automatically sent every week with the link to the service. After every statement it was possible to add some notes, e.g., own thoughts or development ideas. These open questions could be answered anonymously or published to everyone, to be discussed with other colleagues. After filling the form, it was possible to access the personal data and company level curves that were based on averages. Before the measurement periods the employees also took part for two lectures by professionals. Lectures concerned topics such as importance and consequences of emotions at work and short introductions to measurement services.

The second measurement service was wearable technology, a Moodmetric ring that measures the electrodermal activity (EDA). By this it is possible to monitor the emotional arousal or activation, that is, intensity of emotions (not valence, i.e. positive or negative). The ring transfers the EDA data from the ring’s memory to a smartphone application by Bluetooth. From the application it is possible to see the individual mood level (low-high activation, ranging from 0 to 100), relaxed minutes of the day and visualization of the emotional intensity and its variation during a day. The beta-version of the ring and its application was tested in everyday use by eight knowledge workers.

The third measurement service was an application to track discrete emotions and their intensity using a smartphone. The service, called Emotion Tracker, includes eight broad categories of positive and negative emotions: positive and negative activity, positive and negative thoughts, silent positivity, caring of others, negative passivity and uncontrollable bad feeling. Approximately 160 discrete emotions are included under these categories from which a user can browse and select his/her current emotions. Users can also track their current emotions by using a search tool. After labeling emotion(s), users can indicate the intensity of that emotion and make short notes. It is also possible to specify the object or cause of emotion, such as, relationship, family, work, sex, traffic, money or health. As a result, the application creates individual emotion cards including a table of identified emotions and their intensity. In addition, user can see daily, weekly or monthly summary report of top six emotions. Nine knowledge workers were recruited for pilot testing the Emotion Tracker service for one work week. Eight of them returned the questionnaire for providing feedback and user experiences of the service.

According to Scherer (2005), emotions consist of components such as cognitive, neurophysiological, motivational, motor expression and subjective feeling components. With the many measuring tools it is possible to measure different components. The Moodmetric ring monitors the electrodermal activity, thus making it possible to measure the neurophysiological component of emotion (i.e., autonomic nervous system). These emotions can also be unconscious to users. Emotion Tracker and daily experience survey both measures the subject feeling component of emotion. However, the type of emotion measured differs. In survey, only current mood or affect is

measured in terms of valence and activation whereas discrete positive and negative emotions are measured with Emotion Tracker. Through using different methods to measure emotions it is possible to gain a more comprehensive view on emotions.

When it comes to measuring and studying human behavior, it is dispensable to reason about whether the study might suffer from ethical difficulties. However, the data and findings reported in this study do not concern individual's emotions and their relation to knowledge worker's emotional wellbeing. Instead, the study focuses on user experiences that are related to applying different methods for measuring emotions in knowledge work context. Therefore, we see no specific need for discussing ethical concerns in this study.

3.2. Results - User experiences of emotion measures at work

User experiences of daily experience survey

The daily experience survey - named as IPOS sensor - was carried out among knowledge workers in one small company. Feedback on user experience was collected by interviewing 10 persons. Only two out of ten interviewees completed the survey regularly, three did not respond at all, and the rest five people completed the survey irregularly. Causes for low completion rate were diverse. Some of the respondents were not motivated due to no actions had been taken or discussions on future plans had been made after the IPOS Sensor was introduced. Some felt that they had more important work to do or answering was simply too much work. Technical problems such as losing email notification in the mailbox or challenges with the link or tool itself were reported as well. For new personnel the idea of collecting daily experiences with IPOS sensor was obscure, and they thought it did not concern them. It was seen good to have a possibility to add comments when people feel they have something to share. However, most of the interviewees did not enter comments as they already used instant messaging channel where comments are better acknowledged. It was also found that there was no need to be able to follow results daily or weekly but everybody was interested in seeing a snapshot of the results regularly (e.g., monthly) and have reflection on how we are doing, and why. None felt that only seeing and comparing results affect their working habits at this point.

As the case company is small, interviewees felt they can discuss face-to-face or in chat if they have any problems and questions and therefore, there was no need for anonymous feedback channel. For future reference and when company is getting bigger, all the respondents agreed that if the purpose of the survey is clear and the results have future impact, it would be important and interesting to collect data on the daily experiences in the company level. However, the tool for collecting the data should be simple application with only a few straightforward questions. Smaller scale and questions with faces were suggested. The application should be fast and easy to use and always available in mobile and laptop or even in iPad stand. A text message reminder instead of an e-mail would probably increase the completion rate and results could be shared and discussed regularly. The application could be integrated to the instant messaging tool that the company is using. Also other methods were suggested, such as automatic sensor collecting feedback (face movement), daily scrum like chat sessions or diary based system to reflect own day.

Overall, the user experience of IPOS Sensor can be categorized in four points. Firstly, the purpose for collecting data should be defined and communicated to the personnel well before starting the survey. To be more specific, the personnel should be informed how the results are followed and handled, and what kind of actions will be done based on the results. Secondly, data should be collected only when needed or periodically. Based on the survey respondents seemed to answer more regularly during the short intensive weeks than during the time between when data was collected once a week. Therefore, to achieve high response rate, company could do intensive weeks, for example, four times a year instead of continuous once-a-week. Thirdly, the survey should be planned in such a way that the results can be utilized. Fourthly, the results should be communicated regularly and made sure that the intended actions will get done.

User experiences of electrodermal activity (EDA) ring

Respondents wore the EDA ring during five workdays, typically from 8-9am to 4-5 pm. Some respondents wore the ring all day long. Three themes emerged from the analysis of the user experience data: technical issues, linkability to other applications or devices and self-awareness.

Technical issues concerned the ring's usability in daily life such as water resistance, size, and accuracy of measuring. Linkability to other applications or devices was seen beneficiary by the users due to the desire for more comprehensive understanding of the origins of the feelings. Being able to connect the emotional data, for instance with calendar events or other wearable technology, was seen as a complementary and value-adding feature. It seems that wearable technology is considered interesting, but too much to wear is too much to ask.

The test users agreed that the ring measures their emotional intensity quite accordingly and helped improving self-awareness on their emotions and behavior. However, the usefulness of emotional data remained unrecognized. The results may indicate that the link between emotional wellbeing and work performance has not been seen yet by the users. Alternatively, the user's emotional intelligence and emotion-regulation processes may be so well developed and self-evident that no external data is needed.

"I do think it tells something about my emotion changes. But I have not found any good use cases for these data." (Male, approx. 35 yrs.)

"It was interesting to see the results. I could find a correlation with an emotion and a rise in the number. That being said, the information did not provide me any extra value. I knew what I felt and why without looking at the app." (Male, approx. 40 yrs.)

"I experienced several small self-analytical moments when using the ring, which helped to gain new or strengthen existing insights of myself and my reactions. For instance, I am more introvert than I've thought, work is sometimes more relaxing than being at home, I feel strongly emotional about interesting and exciting work. Equally, I feel strongly emotional about repulsive projects, in particular if I get a feeling that the project will exhaust me to my extreme limits." (Male, approx. 35 yrs.)

"Sure! It is interesting to see how feelings and emotional states fluctuate during the day and week. Reading articles alone at work is usually a peaceful moment, which

makes the MoodMetric number drop to 15-20. However if the article is very interesting, then the number can rise quite high. I still don't understand why the emotional load in the mornings is so high." (Female, 25 yrs.)

Some users were surprised about their own emotional reactions, because they had expected the emotional responses to be something else. One has to understand that the ring only measures the amount of arousal (emotional activation): the meter reading can be the same if a person is in a peaceful meditative state or negatively numb. Also according to the circumplex model, an individual can be high in arousal both in negative or positive way, for example, overjoyed or angry. As the ring only measures one dimension (arousal), it cannot tell the difference between these situations. Thus, it should be made possible in the application to mark whether the peaks in emotional activation are caused by positive or negative events. Be the situation positive or negative, it is important to recover from situations that are high in activation. Enduring and long-lasting positive activation can be a burden for well-being as well.

Evidently long term benefits or disadvantages were not reflected, because the five-day test period was relatively short. However, it would be interesting to find out whether the perceived benefits would alter if the user collected data from a longer period of time. It can be assumed, that a five-day test week may not help the user to evaluate how a certain work week is related to other weeks during the year.

User experiences of mobile emotion self-tracking service

The user experiences of tracking emotions were collected using a questionnaire including eight statements related to the impacts of labeling and tracking emotions at work and four questions related to opinions on the use of emotion measures in workplaces. The 5-point scale for the statements ranged from strongly agree to strongly disagree. There were also one open-ended question for other comments and feedback.

Half of the respondents said that tracking emotions was easy. Two respondents reported tracking to be difficult and two were neutral. The vast majority (63 %) did not agree or disagree that tracking emotions in daily work is useful. The usefulness of tracking was supported by two respondents and disagreed by one. The potential usefulness of emotion tracking may not yet be realized due to the short test period. Users also reported inconvenience that manifested in extra work and effort and some even forgot to track any emotions during working. Although the usefulness of tracking emotions was not clear, half of the respondents reported that they had learnt to identify and understand their emotions better during the test week. Two respondents said that no learning had occurred and two could not tell. Learning to identify and label own emotions might take more time.

Somewhat more than half of the respondents reported that through tracking emotions, they had become interested in finding out about their discrete emotions and how to utilize these emotions. Three respondents reported that no specific interest in finding out about specific emotions and their use had occurred. No significant learning effects of the ability to exploit emotions to benefit working were reported. One respondent reported that she/he had learnt to take advantage of discrete emotions at work after the test week. Half of the respondents did not have an opinion and two reported that no learning had occurred. However, somewhat more than half of the

respondents would recommend tracking emotions for knowledge workers. The majority of the respondents (88 %) were of the opinion that, if emotions are measured at work it should always happen on a voluntary basis. Most of the respondents (88 %) were positive towards company offering emotion measurements as a service. More than half (63 %) of the respondents said they would continue emotion tracking also after the test week. The researchers will contact the respondents for follow up.

According to the respondents, measuring emotions and utilizing the data in working life should primarily be based on personal development and self-management purposes (7 out of 8 responses). Reasons for team-level (4 out of 8 responses) and company-level (5 out of 8 responses) measuring were seen as well. It was noted that measuring discrete emotions would be useful as part of knowledge worker's every day working life or periodically conducted. Some respondents reported that measuring emotions should be available and exploitable through occupational health service. One respondent envisaged that measuring could be applied in communities, conflicts, problem-solving and innovations. However, this notion was not further elaborated.

Most of the open comments concerned the usability of the application. Especially the user interface was considered too slow and some automated mechanisms were requested. It appears that users expected the application to be more automated and intuitive. Despite the technical challenges, tracking emotions was considered insightful. Getting a bigger, but also a more detailed, picture on one's emotional life was seen useful. By reporting emotions one could distance herself and make more rational conclusions. On the other hand, tracking emotional data on a daily basis would diminish the risk of overestimating one's emotions. It was seen that in general only the most intensive emotions are the ones that are best recalled. It is possible that this affects interpretations one makes of her life. Furthermore, it might have an impact on one's attitudes and beliefs, and that way personal choices and behavior. However, it was also critically reflected whether users tend to only report on strong emotions.

The question of whom the emotional data should be collected for seems to be relevant. The comments indicate that traditionally different reports have been collected for the use of upper management. However, reporting on emotions is considered personal and the information should be kept private. The benefit of reporting would be realized if people want voluntarily to learn about their emotional information and develop emotional intelligence. Therefore reporting on emotional data is probably best suitable for self-management purposes.

3.2.1. Summary of the results

Strengths and challenges of each emotion measurement service are summarized in Table 2 and discussed below. At their best, all of the services offered a way to gain insights into emotions at work. Measures could be also used at the same time to complement each other in order to get more comprehensive view on emotions. Every approach drew also some criticism from which developmental actions can be conducted.

Table 2. Summary of the emotion measurement services.

<i>Emotion measurement service</i>	<i>Focus</i>	<i>Strengths and opportunities</i>	<i>Challenges and weaknesses</i>
Daily experience survey	Mood (pleasure and activation)	Easy, familiar and inexpensive tool	Problems with the survey tool itself, no clear motivation to respond, subjective data
Electrodermal activity ring	Arousal, activation	Automatic data collection, objective data, also unconscious emotional reactions	Technical issues, usability in daily life, integration to other devices and applications
Tracking emotions	Discrete emotions	Easy and relatively cheap, can awake interest in emotions	Subjective data, no clear idea of the usefulness at work, effort to label emotions

Different types of surveys are a typical way to collect data of one's emotions. In this experiment, daily experience survey (IPOS sensor) was used to find out the overall mood of the employees. Surveys are generally an easy and inexpensive tool. However, to have motivation to fill in the form regularly, employees need to have a clear reason why it matters to take the time. In our experiment this wasn't the case and there were only few committed respondents during the weekly surveys. There were also some technical issues with the survey tool. In the future, the tool should be easy to use with only few well-chosen questions and the results should be reflected regularly.

The electrodermal activity ring provides objective data of one's emotional intensity (arousal). No subjective reflection is needed to collect the data, as the ring monitors activity automatically. Thus in principle, it is not hard to get accurate data of emotions. Still, there were some issues with everyday usability and with the meaning of measuring emotions or the benefits of this measurement. Compared with other measurement services here, the ring is also a bit more expensive. The most significant advantage of the ring relates to the instant and continuous feedback it provides. The user is able to monitor the results constantly and reflect how different situations affect results.

Putting negative emotions into words is one of the best ways to manage negative emotions (Lieberman et al., 2007) and it has been proved that affect labeling yields many benefits for well-being (Pennerbaker, 1997). In our experiment, employees learned to label their emotions with a mobile application. The experiences of this measurement varied again: although many of the employees were not particularly sure how to benefit from the information of the application, half of the respondents reported that they had learnt to identify and understand their emotions better. Getting a bigger, but also a more detailed, picture on one's emotional life was seen useful. Mobile app is also a relatively affordable solution to improve emotional awareness. The vast majority (88%) felt that emotion measures could be provided as services for employees. In this way, the work community could encourage its members to im-

prove emotional skills with measurement tools and provide some training to support getting insights and making use of the data. It is recommended that the employees could themselves plan and choose how to improve emotional skills.

4. Discussion - In the search of an ideal emotion measure for work?

Based on the user experiences of emotion measurement services, managerial guidelines for designing and deploying these type of services were identified. Our experiment revealed that when planning emotion measurement in the workplace, at least five issues should be considered: 1) a goal and a purpose for the measurement, 2) the frequency of the measurement, 3) data ownership and ethical concerns, 4) ease of use and 5) employees' motivation towards measuring emotions.

Goal and purpose – Self-development or company pulse?

In order to be useful and motivating, the clear goal and purpose for measuring emotions at work should be specified. Through testing three measurement services, it was noted that they could be useful for two purposes: to provide information on company level pulse and to support individual self-development. Company level assessment can be useful when identifying baseline and changes during development projects. Emotion measures could also complement other well-being and performance measures. When utilizing measurement at company level, the results should be communicated effectively to employees and shared reflection is needed after the measurement period: what has been learnt and what is going to be done according to the results.

Company level measurement can be divided into teams and departments but comparability of the results might be problematic. It is important to note that, for example, personality affects how intensively emotions are experienced, so it has to be considered how well emotional data of different individuals can be compared. Also emotions influence behavior in different ways: some people get extra motivation from setbacks, as other people may give up. It is essential to learn what are the own tendencies to react to emotions caused by different events.

Therefore, the emotion measurement services at work could be useful especially when provided as tools for individual to support their daily work and well-being. Employee chooses the best tool for their situation and plans what is the appropriate length of the interval and a personal goal. The measurement is done independently based on a personal need, for example, when experiencing a tough period at work, employee can measure stress levels, amount of relaxed time and see how well he/she is recovering from highly intensive moments daily or during the weekend. It is important to have enough also calming periods at work to be able to perform well in the long run. Thus, time for self-reflection is needed. To support this, there could be some self-education materials available.

Frequency and length

The suitable length and frequency of the measurement period varies between the measurement method and the purpose of measurement. To gain deep understanding and insights, the measurement period should be long enough. However, long period takes time from other important task and more motivation is needed. Filling forms and tracking emotions at work may not be suitable for everyday use in the long run, as reporting takes some time. It is also understandable that employees don't feel comfortable reflecting on emotions every day at work. Based on the user experiences, measuring emotions could be useful on a periodic basis. For example, daily experience survey could be done four times a year in one week intervals. At the same time, wearables, emotion tracking services or diaries could be provided to those employees who are willing to have deeper insight on their emotions and they could continue their measurement from one week to four weeks or longer.

A one week's period of measurement does not necessarily offer best possible insights into employee's emotional life, provide learning or encourage making changes in working habits. If one desires to deeply understand the emotional state, one should collect data from a longer period with different working conditions: e.g. meeting tight deadlines, being a bit bored or having a day off. This is a bit problematic, as this long-time data collection should be as effortless as possible, but in our experiment the employees didn't find the proposed services very high in usability.

Employees can better get a more holistic view of the results of the measurement when the data is collected within a longer time than a day or week. Employees should also have access to measurement tools, when they are facing an intensive and enduring time at work to reflect their stress and coping in these situations.

Data ownership and ethical concerns

Management should also state, how the data will be handled after and make statements on the data privacy. It should be made clear, to whom the emotional data belongs and somehow balance the private and public data. When measuring emotions of a group, it should be secured that individuals cannot be connected to data sets. Currently the way in which Moodmetric and Emotion Tracker save data is completely manageable by the user. Thus, organizations should agree with common practices how to interpret the emotional data: is the data only for personal use, or to be discussed with own manager or team or an occupational health member. It is also possible to share data within the whole organization. Because there are many ways to share and interpret data, it should be clear for the employee who can see their own emotional data, before they take part in such experiments. This is especially important when trying to avoid situations where an employee recognizes afterwards that their emotional data and private comments have been shared to others without purpose to do so. We propose that the employee should have the right of decision in these situations, as the emotional data can be seen very personal. Additionally, it is understandable that not every employee is willing to think about emotions at work, so participation in measurement periods should always be voluntary.

Ease of use

It has to be considered what kind of service or tool is required to meet the goal of the measurement. The tool should be easy to use and integration to the other applica-

tions, such as calendar and instant messaging tool, or wearables should be possible. It would also be useful to utilize some contextual data, for example, location information. Sometimes automatic tools such as the Moodmetric are preferred, as they are more user-friendly: one need just to wear the ring, no effort is needed to collect the data.

Motivation towards measuring emotions

As it takes time and motivation to commit to daily measurements, employees and their motivation should be taken into account. It should be made possible that employee has the time to fill in the forms and reflect on the results. Communicating why measurements are carried out and what benefits are to expect should be clear to everyone, as it can bring meaning and motivation to commit to regular measuring. After the measurement there should be a thorough debriefing about what have been learnt, what is going to be done based on to the results and how the employees felt the experiment. It would also be useful to offer information and training concerning emotions' effect on well-being and performance at work and provide other methods, for example mindfulness, to develop employees' emotional skills.

5. Conclusions

In this paper, we have examined various approaches to measure emotions at work. Three emotion measurement services were tested in practice and user experiences were gathered. Managerial guidelines for deploying emotion measurement services were also discussed. Two different purposes for measurement were identified; providing emotion measurement services as self-management tools for employees and conducting company level measurements to gather company pulse.

We assume that recovering from intensive work (whether positive or negative) does not always meet the hopes and expectations of the employee or the employer. Due to individual differences and circumstances, it is challenging to estimate the endurance of recovery. Measurement tools such as Moodmetric ring can give unique and novel possibilities to monitor one's own well-being and performance in real time. By monitoring stress-levels, one could arrange job tasks so that they are in accordance with the emotional wellbeing. For example, when in good moods it's a better idea to commit to more creative tasks, whereas when the mood is negative doing systematic or analytical tasks that require accuracy would be recommendable (Klep et al. 2011; Forgas et al., 2009).

Getting results and feedback immediately can be highly motivating. We also believe that employees will take a more active role in enhancing well-being and performance at work, when it is possible to see, for example, physiological reactions in real time. As compared to typically once-a-year held job satisfaction surveys, emotion measurement services could help employees to take more proactive actions to their personal well-being. Being conscious and accepting the daily fluctuations and emotions and adjusting daily work (to these movements) can be a way to improve well-being and productivity at work.

Future research

By using different methods to measure emotions, it is possible to gain a more comprehensive view on emotions. According to the user experiences from our experiments, it would be possible to develop a broader application to measure the different components of emotions. The application could integrate data from multiple sources, for example objective electrodermal activity data (emotional arousal) and subjective evaluations about the discrete emotions: what emotion is in question, intensity and object or cause. An interesting addition to the application would be a diary possibility and contextual data: to integrate data from calendar application and locations to see, whether the daily events and experienced emotions correlate. Another way would be the possibility to mark the emotional activity peaks, whether they have been experienced positive or negative or what has been the cause. Also some reflection possibilities could be added to find out the behavioral component: for example, if one felt frustrated at work, the reason could not concentrate well enough.

Although this paper focused on practical usefulness of emotion measures at work, these new measures can be used as research tools as well. With a more comprehensive and user-friendly service it would be interesting to carry out some new experiments with more users and also see if emotion measures could be used as interventions to improve daily work. The link between emotions and perceived performance could also be better studied with more users.

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D: Changing geographies of services: Internationalization, regional and local development

D1: Services and local, regional and national development

Chair: Laurențiu Tăchiciu

Tyranny of Distance or Market Potential?

Empirical Analysis on Service Sector Growth in Hinterlands of China

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In the reality of China's service sector development, many cities have taken advantage of their proximity to large cities while others suffered spatial exploitation of large cities. Despite the pivotal role of the hinterlands in theories of the development of the urban hierarchy, there has been little literatures related to the effect of service agglomeration of metropolitan on service sector growth in the hinterlands, especially in developing countries. By reviewing the relevant studies in the New Economic Geography, this paper has created an empirical framework to examine the effect of central cities on the development of service sector in hinterlands, and examined how proximity to different hierarchy cities affects the service sector and sub-sectors growth of hinterlands by using the spatial econometric model on the data of cities at or above prefecture level in China's three city clusters. Results indicate that when taking the distribution of different hierarchy cities into account, service sector growth in hinterlands is more dependent on the geographic proximity to higher hierarchy cities than the market potential caused by the near metro cities.

1. Introduction

Over the past thirty years, the wealthiest OECD economies have experienced rapid de-industrialization and more than three-quarters of employment in many OECD countries is now in services, while industrial sectors, on average, account for less than one-fifth. And for China, one of the greatest economic challenges it facing in recent 10 years has been the adaptation to a service-based economy. Service sector is now contributing more than 48.2% of GDP (Figure 1), and for some metropolises like Beijing, Shanghai and Guangzhou, the ratio is over 50%. Service sector is tipped to replace the manufacturing industry and become the strongest driver of many Chinese cities.

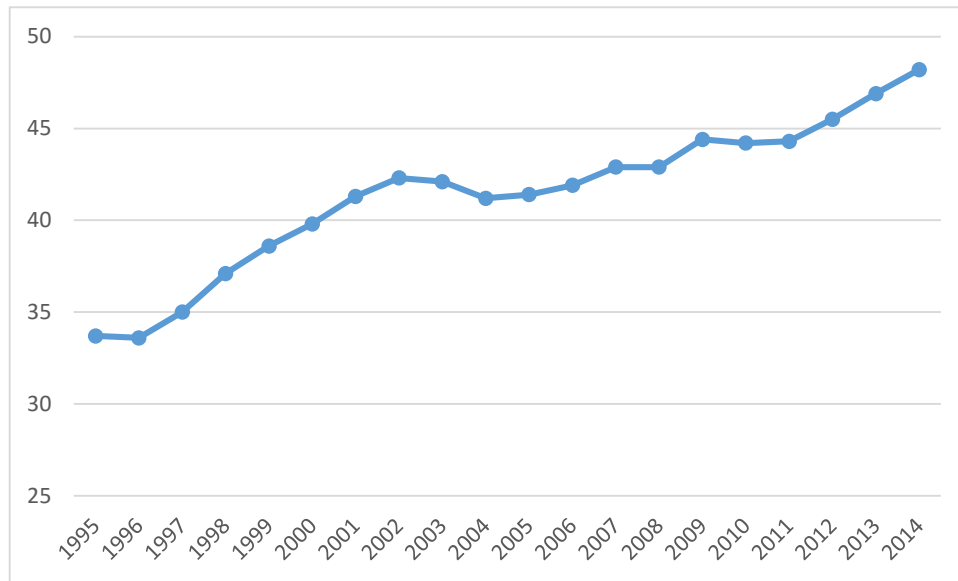


Figure 1: China's Ratio of service sector added-value to GDP(1995-2014)

There's many controversies on whether China should aim to build mega cities or follow a more balanced approach of regional development in the process of the-new-type-urbanization. In reviewing the development of service sector, we are able to identify many cities that took advantage of their proximity to regional centers in developing service sector. These instances include Ma'anshan's rapid development of leisure and entertainment services with its proximity to the central city of Nanjing and the case of real estate boom in peripheral counties of Beijing. However, there are also instances where large cities deprived neighboring cities of service sector opportunities. For instance, as they grow larger and more competitive, private firms based in Jiangsu and Zhejiang provinces began to relocate their headquarters, regional head offices and R&D functions to downtown Shanghai. Hong Kong and Guangzhou absorbed most high-end purchasing power in lower-hierarchy cities of the Pearl River Delta region. Beijing's attraction of cultural and tech resources has resulted in a poverty rim around the capital¹. Judging by China's reality, service sector has either prospered or perished all because of its proximity to a central city. However, conventional wisdom believes that service industry is characterized by concurrent production and consumption and that many service activities cannot be traded. As a result, geographical factor has long been excluded from academic research on service sector, so we are left with very limited understanding on the interaction between central city and hinterland regarding service sector development. Furthermore, compared with world-class urban clusters², China's primary cities of top three urban clusters

¹ Ding Jun, et al.: *Capital-rim Poverty Belt: 25 National-level Poverty-stricken Counties around Beijing*, 21st Century Economic Report, September 13, 2009.

² According to Yu Hongsheng (2010), measured by city primacy ratio, New York accounts for

are less influential but urban diseases have already occurred at this stage. Take Shanghai for instance, its economic primacy ratio kept on the decrease between 1994 and 2014 with primacy ratios of value added of service sector on the significant decline after a short increase in 2005 (Figure 2).

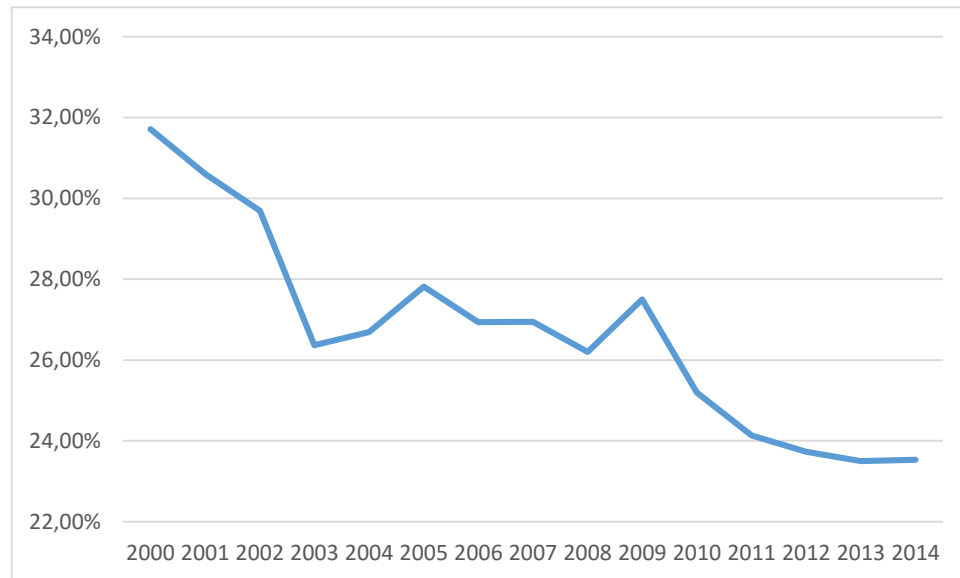


Figure 2: Shanghai's Primacy ratio of service sector added-value (2000-2014)

This paper focuses on the roles the regional center cities of different hierarchies play on the service sector growth of hinterlands, especially the effects of discrete distance penalty Metros play on their hinterlands. By reviewing the literatures of New Economic Geography, this paper has created an empirical analysis framework to examine the influence of a regional center cities on the service sector of hinterlands by using data above prefecture level for the China's three biggest urban clusters, i.e. Yangtze River Delta, Pearl River Delta and Around Bohai region.

2. The distance effects of urban hierarchy and service sector growth: literature review

2.1 Center-hinterland relationship of the service sector

Since Christaller published Central Places of South Germany in 1933, central geography theory has demonstrated very strong explanatory power till this

more than 22% of the US economy while Tokyo represents over 24% of Japan's economy.

day. According to the theory, under the assumption of desirable land surface and economic man, the space of activities has a remarkable feature of geographical centralism with central places servicing as nodes that provide all kinds of goods and services to residents in the hinterlands and defined by coverage of its service sector. Theory of new economic geography has introduced increasing return to scale into analysis and explained agglomeration using input-output correlation and accumulation of real wage effect. In a city system constructed under this theory, a small city only provides less competitive basic products, leaving more important goods and services to cities at higher levels. Hierarchical structure of cities is still highly consistent with central geography theory (Fujita and Thisse, 1996). But in order to follow the simplified assumption of iceberg cost, new economic geography only includes the movement of goods into the scope of analysis yet neglected the movement of people in the region. The model is created entirely based on the two-department (agriculture and industry) assumption and almost excluded service sector from consideration. With growing IT penetration, globalization and service outsourcing (Sassen, 2000), relocation of business production and activities gave rise to spatial reconstruction of cities. In parallel to the decline of manufacturing functions, high-end production services like accounting, legal affairs, advertising and consulting business are growing rapidly in central places (Castells, 1996). As production venues of high-end services, cities offer a vastly extended scope of products and geographical coverage. Their function as central places under city hierarchical system are increasingly replaced by intricately intertwined city networks featuring regionality, functionality and hierarchy. Center-hinterland relationship is giving way to a network of service-based cooperative relationship and service delivery cannot take place without frequent movement of people. In response to changes taking place in city system and the relationship among hierarchies with regard to the development and agglomeration of service sector, it is imperative to reevaluate the emergence of central places and their interactions from the perspective of urban service network.

Although Sassen's (2002) global city model well reflects changes in the spatial model, he focused only on networks linked by inter-regional production services and paid no attention to intra-regional spatial layout and center-hinterland interaction. Among existing studies, spatial spillover is considered to contribute to regional convergence (Rey and Montouri, 1999). For instance, Ertur et al. (2006) discovered a strong spatial spillover effect in the convergence of 138 regions of Europe between 1980 and 1995. Fingleton and Lopez-Bazo (2006) noted in their comment on spatial effect of growth that a region's growth rate is not only subject to the initial conditions of capital and human resources but conditions of neighboring regions. Negligence of inter-regional spatial dependence and heterogeneity will result in a series of wrong assumptions (Abreu et al., 2005). Despite fruitful results of overseas studies

on spatial spillover, existing literature studies on the spatial effect of China's regional economic growth are limited, particularly data of prefecture-level cities and studies on growth pattern and interactions of industries in the same category between cities of different regions and types. Using provincial-level data, Ying (2003) estimated China's output growth between 1978 and 1998 and found a negative inter-regional spatial self-correlation, explaining it as an effect of regional polarization in China's economic growth. Using China's inter-provincial GDP data, Jeon (2007) tested Nicholas Kaldor's hypothesis and found a weak relation of inter-regional dependence. Using vector self-regression model, Groenewold et al. (2007) conducted dynamic simulation for the effect on other regions when one region is under external impact using a three-region framework. Madariaga and Poncet (2007) discovered significant spatial dependence and rapid convergence between cities with respect to per capita GDP. On the contrary, using spatial econometric method, Lin et al. (2006) observed a tendency of dispersion in China's inter-provincial economic growth. Obviously, almost all existing studies are conducted based on provincial data and given that China's provincial administrative boundary usually will not overlap with economic boundary, it is improper to conduct this type of research based on the unit of provinces (Herrmann-Pillath et al., 2002). As a rare paper correlating geography with service sector, Lu Ming et al. (2012) studied the effect of distance between regional large cities on the labor productivity of service sector yet neglected the heterogeneity of service sector and the complexity of regional city system. Their simplified configuration of geographical factor failed to reveal the effect of distance on service productivity. Hence, with different types of cities, empirical study on growth path and spatial effect of service sector and its sub-sectors can increase data quantity and proximity of samples and reduce sample heterogeneity, which is of great significance to enriching currently very limited empirical analysis literature studies on the spatial effect of regional growth and arrive at convincing conclusions.

2.2 Death of distance or tyranny of distance: the role of geographic factor in the development of service sector

Compared with manufacturing, service sector relies more on face-to-face communication. Under the traditional considerations, services cannot be transported over a long distance and thus does not comply with iceberg cost hypothesis. Below threshold distance, there is little difference in the cost of transportation; above threshold distance, marginal cost of transportation is infinitely high, and that is why that distance rarely entered the horizon of research on the service sector. In addition, improvement of information technology and transportation has led to flat service organizations like e-commerce, online media, online office and online meeting. Many scholars

believe that geographical factors such as distance and location are no longer problems in service production and delivery (especially between cities of high hierarchy), i.e. death of distance (Harvey, 1990; O'Brien, 1992).

However, more and more studies discovered that for quite a few service firms, technology did not eliminate their location-based decision-making and information technology supplemented but did not replace face-to-face communication (Glaeser and Kohlhase, 2004); as development of many service sectors relies on information externality, face-to-face communication became more frequent (McCann, 2007). Partridge *et al.* (2008a)'s empirical study indicates that between 1950 and 2000, geographical cost to remote hinterland cities in the United States kept increasing despite improvement of information and communication. Considering that services *per se* are studied as a special form of final product rather than a participant of production process, the effect of geographical factor on service sector seems very limited. Different from traditional services, producer services that offer professional knowledge and creativity can benefit from an extended scope of service provision. For productive service firms, technology may neutralize distance factor as a barrier but in reality, more service industries have taken on new features of agglomeration under the backdrop of economic globalization (Swyngedouw, 1997). Improvement of IT and commuting conditions did not eliminate the effect of distance but resulted in a mixture of agglomeration and dispersion in different ways than before (Sassen, 2000). It needs to be noted that regarding how the rapid growth and agglomeration of central places affect service industry of other regions and particularly remote regions, both theories of central place and new economic geography offered no final conclusions.

On the whole, geographical factor can promote industrial growth in many ways (Jovanović, 2003; Puga, 2010) such as proximity to input products and markets (King *et al.*, 2003; Rosenthal and Strange, 2003; Andersson and Hellerstedt, 2009), proximity to skilled workforce (Glaeser *et al.*, 1995; Simon, 1998, Simon and Nardinelli, 2002) and absorption of positive knowledge spillover from firms of supply side and demand side (Crescenzi, 2005; Ketelhohn, 2006; Maine *et al.*, 2010). Knowledge spillover from an industry is referred to as MAR (Marshall-Arrow-Romer) externality³ and knowledge

³ For the industrial promotion effect of MAR externality (localization agglomeration), existing studies are far from reaching an agreement. Partridge *et al.* (2008) found a negative correlation between initial employment of manufacturing, retail sales and services of US counties and the growth of above-mentioned industries in the 1990s. Feser *et al.* (2008) found in their empirical study on counties of Appalachian Mountain that existence of industrial agglomeration cannot accelerate industry growth; Duranton *et al.* (2010) reached similar conclusions through an empirical analysis on France. Glaeser *et al.* (1992) and Partridge and Rickman (1999)'s study found more evidence to support Jacobian externality. Maine *et al.* (2010) believe that in addition to absorbing the knowledge spillover of local firms in the same industry, firms are more likely to receive knowledge spillover from adjacent research institutions, universities, suppliers and clients. Knowledge spillover promotes industrial development through enhancement of corporate human

spillover from between diverse industries of large cities is referred to as Jacobian externality. Above factors are all embodied as driving effect of metropolis (North 1955; Glaeser and Khan 2004; Rosenthal and Strange 2001). Besides, infrastructure, technology and industrial superiority of metropolis will also generate a spillover effect on hinterlands, affecting the latter's service sector growth and job structure (Duranton and Puga, 2001). Crowding out effect of metropolis such as exorbitant land cost and pollution will lead to a spillover effect of central place on hinterlands (Glaeser, 1997). As research deepens, people began to realize that though most knowledge spillover relies on face-to-face communication in a limited region (Crescenzi, 2005), economies of agglomeration are not confined inside the boundary as shown by previous research. Meanwhile, economies of agglomeration become thinner while crossing over the boundary. The greater distance from central places, the less hinterland can benefit from economies of agglomeration and spatial spillover. This lead to tyranny or penalty of distance (Hanson, 1998) and the degree of impact decays with the increase of distance.

Scope of economies of agglomeration varies with different attribution of externality. Some studies believe that knowledge spillover thins rapidly through face-to-face communication but labor pool and investment sharing can extend to remote hinterlands (Rosenthal and Strange, 2001; 2003). According to the study of Rosenthal and Strange (2005), knowledge spillover can influence productivity 50 to 100 miles away. Effect of market potential will not dissipate until beyond 800 miles. Even for small central places, their agglomeration spillover effect and labor market dispersion effect arising from commuting extends beyond 180 kilometers (Partridge, Bollman, Olfert and Alasia, 2007). Considering that economies of agglomeration may vary with different hierarchical status of a city, the thinning process and effect on city system and hinterland can be non-continuous (Eaton and Eckstein, 1997; Brühlhart and Koenig, 2006). Furthermore, smooth and successive changes caused by market potential in New Economic Geography theory have ignored the discrete changes caused by the distribution of different hierarchy cities, which will lead to an incomplete measure of agglomeration spillovers on service sector growth of hinterlands(refer to Figure 3). Hence, service growth and employment will be subject to the market potential of central places and adjacent cities of other hierarchies.

capital or indirect increase of corporate productivity (Rauch, 1993).

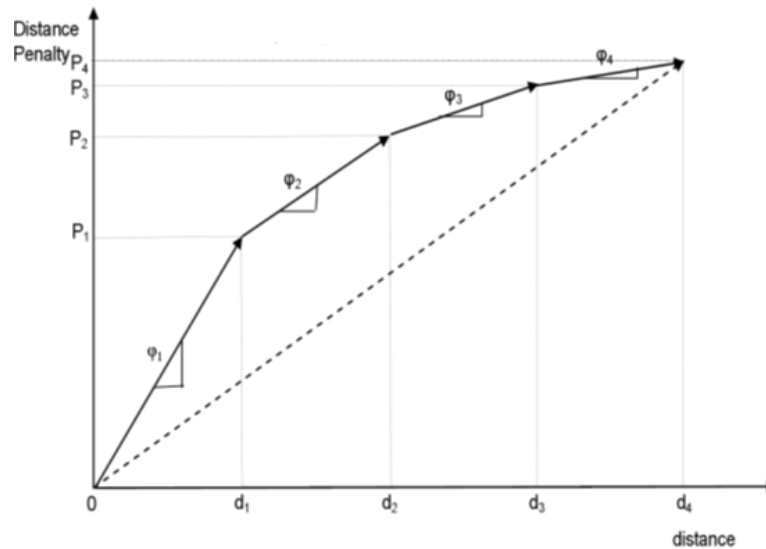


Figure 3: Discrete distance penalty vs. market potential

Theory of new economic geography notes that due to self-reinforcement, once occurred, agglomeration will rapidly develop and maintain a stable condition with the elapse of time (Krugman, 1991). Rapid growth of metropolis will extract products, services and human capital from hinterlands, causing a negative spillover of growth, i.e. shadow effect (Tallman *et al.*, 2004; Rosenthal and Strange, 2003; Dobkins and Ioannides, 2001). Some studies suggest that shadow effect exists and is heterogeneous with magnitude partially subject to a region's development stage. In the initial stage of industrialization when central places come into being, shadow effect is weak; in the second stage of hinterland's population expansion and supply of agricultural produce to central places, central places and hinterland develop in tandem (Fujita *et al.*, 1999); in the process of industrialization and urbanization, shadow effect strengthens, uneven regional growth solidifies and shadow effect intensifies⁴. Net effect of proximity to metropolis depends on whether growth spillover effect or agglomeration shadow effect is in a dominant position. Liu *et al.* (2011)'s empirical study on China suggests that high-hierarchy cities will have a positive net effect on the growth of peripheral regions, which is consistent with the study of Partridge *et al.* (2007, 2008b)'s study on the United States. In addition, studies based on high-tech services suggest that distance has a heterogeneous effect (Arauzo-Carod and Viladecans-Marsal, 2009; Anselin *et al.*, 2000). However, judging by existing studies, although hinterland is important in explaining the development of urban system given that it supplies natural resources to central places, receives the influence of central places and may even become central places

⁴ Refer to the empirical analysis of Tervo (2011) on regional structure evolution of Finland before and after the World War II.

itself, and many literature studies examined hinterland from the perspective of empirical pattern of urban system⁵, both central place geography theory and new economic geography theory paid little attention to the effect of service agglomeration of metropolitan on service sector growth in the hinterlands, especially in developing countries.

2.3 Summary

To sum up, for service sector, near to higher-tiered cities means not only the types of services hinterlands can get, but also the cost of achieving these services. Hence, service growth and employment of hinterlands will not only be subject to the market potential of central places and adjacent cities, but also subject to the distance to higher-tiered cities. The following parts attempt to conduct an empirical analysis on the role of distance in the growth of service sector of cities at or above prefecture level in the period 2002-2012⁶, offering policy implications on reducing regional gaps of service sector and the development of regional and urban service sector. Different from previous studies, this paper is committed to discussions on the magnitude and mechanism of interaction between central places and hinterland in such respects as intra-industry agglomeration, urban economy, spillover of human capital⁷ and neighboring industries and purchasing power spillover using two types of sample of metropolises and hinterlands. Existing studies indicate that the institutional barrier of trade has important value in explaining China's regional economic growth and some literature studies have proven the existence of inter-provincial frontier effect (Poncent 2003; Amiti and Javorcik 2008) while frontier effect is partly driven by local protectionism and spatial exploitation⁸. Hence, we have included institutional variables including trade openness and local protectionism into the model for consideration.

⁵ There are quite a few studies on hinterlands regarding empirical patterns such as city hierarchy. Refer to Gabaix, 1999; Eeckhout, 2004; Duranton, 2007.

⁶ According to the *Planning*, considering that Anhui city directly receives industrial relocation and direct influence of Yangtze River Delta region, we included Hefei, Wuhu, Ma'anshan and Tongling cities into scope of analysis.

⁷ A city's absorption power or the region's ability to convert knowledge spillover into growth is subject to the level of human capital (Rodriguez-Pose, 1999).

⁸ As for the effect of local protectionism on trade, please refer to Bai *et al.* (2004) and Lu and Tao(2009) *et al.*

3. Empirical analysis

3.1 Baseline Model

In order to incorporate factors affecting economies of agglomeration mentioned in neoclassical and new economic geography theory (Ottaviano and Pinelli 2006; Tabuchi and Thisse, 2006), we chose to follow the analysis framework of Roback (1982). According to the above analysis and assumption, the development level of service sector is subject to the effects of population density, local income, human capital level and tyranny of distance (distance to the higher-tiered cities). Our baseline model is as follows:

$$Y_{it} = \alpha_0 + \alpha_1 X_{it} + \alpha_2 DA_i + \tau_{it}$$

Where, DA reflects potential accessibility to higher-level service resources in high-hierarchy cities. Dependent variables describe service sector employment; service sector value added; service sector employment agglomeration and service sector value added agglomeration. For

independent variables, X is city i 's attribute vector, which includes trade openness⁹, urban density, resident income level and human capital level¹⁰,

and τ is a residual error. Level of human capital is described by the ordinary high school population which reflects the local absorption of knowledge spillover. DA refers to the additional distance to the nearest higher hierarchy city, that is, the additional distance from the nearest metro city to the nearest higher hierarchy cities (km).

Different from previous studies, this paper has made the following special treatment to the selection and estimation of explained variables and explanatory variables:

First, it has overcome the defect of studying highly heterogeneous services as a whole¹¹. According to definition of Browning and Singelmann (1975), service

⁹ Due to unavailability of inter-city trade data, inspired by Fujita *et al.* (1995), port denotes the level of convenience of import and export in a region, so here, we use whether a city has a port to denote trade openness.

¹⁰ In estimating growth using value added of service sector, we may also add the variable of initial per capita output level.

¹¹ Browning and Singelmann (1975) divided services into four categories by function: producer services, including banking, trust and other financial services, insurance, real estate, engineering and construction services, accounting and publishing, legal services and other types of commercial services; distributive services, including transportation, warehousing, communication, wholesale, retail (excluding catering retail); social services, including hospitals, education, welfare and religious groups, nonprofit organizations, postal services, government and other social services;

sector is divided into producer services, distributive services, personal services and social services for the research on their respective growth patterns. Given the regional attributes of China's culture and health sectors, this paper conducts a separate study on culture, sports and entertainment sectors.

Second, considering different development drivers, cities in three urban clusters are divided into two sub-sample groups of metropolises and hinterlands. If placed under the same sample group, the heterogeneity of service growth in hinterlands and metropolises is likely to be concealed and due to different levels of development, growth rates of service sector between metropolises and hinterlands are incomparable.

Third, in order to prove the existence of access penalty and its reinforcement attribute, this paper considers the impact of urban hierarchy system and interactions between cities, dividing distance variables into distance to neighboring central cities and incremental distance. In order to accurately measure incremental distance, this paper divided all cities of the three urban clusters at or above prefecture level into four hierarchies¹² in relation to population¹³, administrative level and economic vibrancy: the first hierarchy refers to national large city, i.e. Shanghai; the second hierarchy refers to regional large cities, i.e. Hangzhou and Nanjing, which are both provincial capitals and centers of an economic region; the third hierarchy refers to provincial capitals, which include provincial capitals Hefei and Ningbo as secondary provincial cities in addition to the above-mentioned two hierarchies; and the fourth hierarchy includes all prefecture-level cities.

3.2 Data

The sources of data analyzed in this research are from China City Statistical Yearbook 2001-2013, compiled by the State Statistical Bureau of China. Using panel data of cities at or above prefecture level from 2002 to 2012, this paper conducts an empirical analysis on factors affecting service sector employment and add-value in cities of the 3 biggest Chinese city clusters. In order to control sample heteroskedasticity, this paper adopted GLS regression method of panel data. According to Hausman test result, this paper estimated the samples using fixed effect model.

personal services, including household services, hostel and lodgment, catering, repair services, laundry, hairdressing, etc.

¹² See Wei Shouhua *et al.* (2012): *City Hierarchy and Service Sector Development – based on Share-Deviation Analysis Method*, *Industrial Economic Research*, 4th Issue of 2010, page 32 to 39.

¹³ Based on standard of urban population.

3.3 Factors affecting service sector growth in hinterlands:

panel data analysis

Appendix table 1 is the result of GLS estimation of panel data for hinterland cities of the three urban clusters. According to the result of fitting, with the exception of personal service agglomeration, the equation demonstrates strong explanatory power for changes in the employment and value added of other services. Generally speaking, improvement in transportation and information technology did not eliminate the effect of distance on service sector growth in three urban clusters of China. Distance from cities of higher hierarchy¹⁴ will give rise to marginal penalty of distance on growth of local service sector; the causal effect of high-hierarchy cities on service sector of hinterlands not only exists but demonstrates strong heterogeneity as well.

As the top hierarchy metropolises in the region, Beijing, Tianjin, Shanghai, Shenzhen and Guangzhou has a centric driving effect on the value added and employment growth of all the service sectors of hinterland cities. The greater additional distance to them, the slower service sector grows, i.e. tyranny of distance does exist. As we can see from appendix table 1, second-hierarchy cities also have a major driving effect on the growth of value added and employment of some service sectors, especially the producer services and distributive services. The above conclusions are different from the result of empirical study of Partridge *et al.* (2008a)¹⁵ on urban population growth of the United States and similar to the result of study by Duranton and Puga (2001) and Desmet and Rossi-Hansberg (2007) on the effect of high-hierarchy cities¹⁶.

As for the growth of service sector employment, nearest metropolis do not show any significant influence on service development in hinterlands (Appendix table 2), and there is also no significant correlation between population and income level of nearest metro and service sector employment growth, which did not verify the existence of market potential effects. The nearest metropolis has a driving effect on the growth of service sector value added, but proximity to the nearest metro cities has a certain restrictive effect on the growth of local social service sector. Greater distance from nearest metropolis also means highly probability for the growth of employment in service sector and the culture, sports and entertainment services agglomeration. Considering that service sector of regional center cities are

¹⁴ Here it refers to the first-hierarchy and second-hierarchy cities.

¹⁵ Partridge(2008a)'s study on hinterland cities of the US indicates that proximity to higher hierarchies of cities in an urban system is a major driver of population growth in hinterland cities.

¹⁶ Duranton and Puga(2001) and Desmet and Rossi-Hansberg (2007) *et al.* believe that technology innovation will increase the value of agglomeration economies of a certain type and thus increase the benefits from proximity to the highest-hierarchy city.

still in the stage of agglomeration, proximity to them will exert a shadow effect on the service sector employment of neighboring cities. Comparing to the distance effects of high-hierarchy cities, market potential effects have a relative low impacts on the development of service sector growth of hinterland cities, and the larger the metropolis is, the stronger such spatial exploitation becomes.

On the whole, central agglomeration effect is more important to producer services and distributive services, which provide intermediate rather than final products. Compared with other cities, cities of the highest hierarchy have the most significant effect of dispersion on neighboring regions and the most of growth momentum for producer services and distributive services in hinterland cities. Growth of less tradable personal services is traditionally considered to be subject to the effect of local factors. Paul Krugman noted in his *Geography and Trade* (2000) that “(to the effect) in the second half of the 20th century, a considerable number of US workforce were employed in service sector rather than manufacturing. Many of these services are untradeable and have the same geographical distribution with population employed in the manufacturing of goods – regional Gini coefficient of fast food stores, day care centers and divorce lawyers must be very close to zero.” Though the empirical result indicates that employment growth of personal is not influenced by geographic factors, but social and creative services is still subject to the integrated effect of spatial spillover of higher-tiered cities. For social services that have the nature of public goods, proximity to public infrastructure of nearest metropolis will result in the loss of clients and thus restrains development of local social services. For cultural services that Chinese cities are enthusiastic to develop, hinterland cities close to the first hierarchy cities have a natural advantage of talent, market and knowledge spillover but second-hierarchy will not have a significant spillover effect. As for the third-hierarchy cities, near to them will even have a shadow effect on the development of creative service employment in hinterlands (appendix table 2).

In addition to distance, service sector of hinterland cities in the three urban clusters is subject to the impact of some other factors. Different from conclusions of Murphy *et al.* (1989) and Ades and Glaeser (1995) on industrial development and population agglomeration, industrialization and urbanization failed to promote value added and employment of service sector as a whole. Service growth of hinterland cities is mainly correlated with geographical distribution of purchasing power, i.e. household income level, and urban density do not have a significant effect on service sector employment. Initial scale is in positive correlation with service sector employment, which suggests that service sector agglomeration is a source for the increase of value added and job creation of local services. This conclusion supports relevant assessment of Desmet and Fafchamps (2005) and Fallah *et al.* (2012). Similar to the conclusions of Brühlhart and Sbergami (2009),

Henderson (2003, 2005) and Fujita and Thisse (2002), initial industrial scale can self-reinforce and promote growth and localization economies have a significant positive effect on the job growth of service sectors. That is to say, for job growth of service sector, proximity to large cities with input factor and client resources is more important than the market potential. Factors of trade openness such as access to port will promote the growth of value added and employment in service sector. Despite unclear causal relationship¹⁷, human capital inventory can significantly promote the value added and job growth in service sector as a whole. However, availability of human resources and absorption of technology spillover are not embodied in the growth of the producer, distributive, personal and social service sectors. Different from the study of Sridhar (2010) on India, accumulation of human capital cannot effectively promote the growth of service sector in hinterland cities and currently all service sectors are yet to enter the stage of technology and human capital driven growth.

3.4 Neighbour factors affecting service sector growth: spatial regression models

Given the likely presence of spatial dependence, spatial panel regression models were run for testing. In order to reflect the spatial influence of cities of the same hierarchy, we have included the average distance variable of nearest two neighboring prefecture-level cities into the equation. In these spatial regression models, neighbouring cities are defined using geographical proximity as measured and weighted by the travel distance. Appendix table 3 and table 4 shows a clear pattern of positive spatial autocorrelation among cities.

On the whole, there's no difference with respect to distance to the higher-tiered cities factor between non-spatial and spatial regression models. Similar to the conclusion of Sridhar (2010), penalty of distance has a significant effect on the growth of service sector and sub-sectors in hinterlands of three urban clusters. The more distance from higher-hierarchy cities, the slower service sector grows. Different from the growth pattern of non-spatial models, the sources and impact direction of spatial spillover effect are relatively heterogeneous of higher-hierarchy cities, and the nearest metro cities have a significant effect of negative spatial spillover on the growth of service sector and sub-sectors in hinterlands, which indicates that the third hierarchy metropolises of China's three city clusters have a strong absorption power of resources from the hinterlands.

¹⁷ For a human capital intensive industry, it is possible that the abundance of local service jobs resulted in the relative abundance of human capital inventory.

Regarding the spatial spillover effect of neighboring cities at the same level, lower-hierarchy cities have not played a supportive role to the growth of service sector in hinterlands. Service sector value added and producer service employment has a significant effect of agglomeration, and neighboring cities have played their role as labor pool for service sector, especially personal and social service employment. As for service agglomeration, however, competition effect of growth is at play, i.e. proximity to cities of the same hierarchy with significant income level has a siphoning effect on the development of local service sector. Neighboring cities with great scale of population will benefit the development and agglomeration of local social services.

Different from the results of non-spatial models, population density is also a major driver of service sector development in hinterlands, especially for value added. Human capital level has a strong positive effect on the development of service sector and sub-sectors, which indicates that knowledge spillover and absorbing capability are crucial to the service sector growth in hinterlands.

4. Conclusions and policy implications

Location of a city in the city hierarchy system is vital to the development of service sector. Exclusion of distance factor in the research on service sector will result in the negligence of an important dimension in service sector and cause deviations in the result of study. Result of this paper indicates that continuous improvement in transportation infrastructure and information technology did not flatten the development of service sector in the biggest three China's urban clusters, and on the contrary, highlights the value of central place agglomeration. Access and proximity to higher-tiered cities especially the first hierarchy cities brings about conveniences arising from economies of agglomeration and are more outstanding in the promotion of service sector growth in hinterland cities, compared with market potential factors described in NEG.

Empirical study on the three Chinese urban clusters suggests that the penalty of distance on the growth of service sector in hinterland cities not only exists but is a major factor of influence. Service sector agglomeration in regional central cities is currently in continuous enhancement and affects service sector growth of hinterland cities in the form of regional competition and shadow effect. So hinterland cities may benefit from mutual growth by improving transportation with first and second hierarchy cities and proactively matching service demand from them. Third-hierarchy cities affect neighboring hinterland cities mainly in the form of supply spillover and currently, hinterland

cities can only passively receive the effect and proactively undertake consumption spillover.

Empirical results of this paper support the analysis of Fujita and Mori (1997), Fujita et al. (1999) and Chen et al. (2010) on center-peripheral model but having taken city hierarchy system into account, relationship between center and hinterland becomes more complicated, becoming a dynamic system featuring the coexistence of centric drive and spatial exploitation and interaction between support and competition. In addition, this paper also suggests that service sub-sectors are indeed highly heterogeneous, although study on service sector as a whole may reflect general patterns of its development, it may also conceal special factors of influence for specific industries and may even arrive at totally opposite results.

This study helps deepen our understanding on the tendencies of new-type-urbanization and growth patterns of service sector. In recent years, there have been heated debates on the “diseases of big cities” in China, which aroused reflections among academia and decision-makers on unilateral city circle and uneven development arising from it. In fact, both the NEG theory and our empirical results indicate that debates are meaningless on whether mega-cities or small and medium-sized cities are more desirable in new-type-urbanization. Agglomeration is a self-reinforcing existence and the strength of market derives from economies of scale rather than government planning and plays a decisive role in the formation of city system linked by service sector. The world has to become pointed before it becomes flat. Whether spatial spillover or shadow effect takes hold depends on the development stage of a city. Policy-enabled creation of multi-core network development pattern to achieve regional growth convergence is not only damaging to the spatial spillover of mega cities but will cause serious efficiency loss and impede the development of regional service sector as well. In order to promote the development of regional service sector, mega cities as primary cities of urban clusters should not only expand in space but focus on the upgrade of urban functions, develop productive and distributive services, avoid regional protectionism in service resource allocation. Hinterland cities should offset the tyranny of distance by improving transportation infrastructure connecting with mega cities and proactively match the spillover of services including recreation and health services from regional central cities for balanced development of service sector based on reasonable division of labor.

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Appendix Table 1: Baseline Model Results-panel data analysis														
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
	Employment	value-added	producer	distributive	personal	social	creative	employment agglomeration	value-added agg	producer agg	distributive agg	personal agg	social agg	creative agg
desi ty	-0.393	2.404	-0.465	-1.208	0.162	-0.197	-0.177	-0.341	0.675	-0.377	-0.507	-0.00915	-0.171	-0.105
	(-0.09)	(0.48)	(-0.11)	(-0.24)	(0.02)	(-0.05)	(-0.04)	(-0.23)	(0.24)	(-0.33)	(-0.35)	(-0.00)	(-0.10)	(-0.09)
inc om e	0.0927* **	0.915 ***	0.199** *	-0.107***	-0.0741	0.122 ***	0.0358	-0.0281***	-0.0104	-0.0259* **	-0.0465***	-0.0260	-0.0114	-0.0118
	(4.41)	(33.19)	(6.21)	(-2.76)	(-1.14)	(4.17)	(1.01)	(-3.84)	(-0.76)	(-3.01)	(-4.06)	(-1.21)	(-0.90)	(-1.31)
hu ma n	0.0185* **	0.0930***	0.0289	-0.00645	0.0375	0.0264	0.0103	0.00268	-0.00115	0.00186	0.00204	0.0102	0.00240	0.00197
	(3.51)	(10.30)	(1.43)	(-0.26)	(0.89)	(1.43)	(0.46)	(1.55)	(-0.36)	(0.34)	(0.28)	(0.72)	(0.30)	(0.34)
DA 2	-0.0330	-0.079g**	-0.0643* *	-0.0729**	-0.0798	-0.0147	-0.0262	-0.0172*	-0.0492***	-0.0239* **	-0.0208**	-0.0181	-0.0123	-0.0108
	(-1.16)	(-2.37)	(-2.05)	(-1.98)	(-1.47)	(-0.49)	(-0.77)	(-1.71)	(-2.61)	(-2.82)	(-1.99)	(-1.12)	(-0.95)	(-1.29)
DA	-	-	-	-0.0684**	-0.0339	-	-	-0.0215***	-	-	-0.0165*	-0.0116	-	-

1	0.0606* **	0.0793***	0.0763* **			0.0625**	0.0574**		0.0396***	0.0208* **			0.0254**	0.0139**
	(-2.62)	(-2.90)	(-3.01)	(-2.29)	(-0.77)	(-2.58)	(-2.09)	(-2.64)	(-2.58)	(-3.03)	(-1.95)	(-0.88)	(-2.42)	(-2.05)
Con sta nt	1.735** *	9.348***	-1.392** *	2.059***	-2.662** *	0.853***	-1.900* **	0.687***	0.552***	0.589** *	0.788***	0.349**	0.621***	0.399* **
	(9.35)	(38.38)	(-5.98)	(7.13)	(-5.23)	(4.09)	(-7.25)	(10.66)	(4.57)	(9.40)	(9.15)	(2.01)	(6.95)	(5.96)
N	1562	1562	1420	1420	1420	1420	1420	1562	1562	1420	1420	1420	1420	1420
r2	0.959	0.938	0.940	0.875	0.715	0.987	0.893	0.969	0.976	0.931	0.829	0.585	0.992	0.864

Appendix Table 2: Baseline Model+ Market Potential Results-panel data analysis														
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
	Employment	value-added	producer	distributive	personal	social	creative	employment agglomeration	value-added agg	producer agg	distributive agg	personal agg	social agg	creative agg
desi ty	-0.393	2.404	-0.465	-1.208	0.162	-0.197	-0.177	-0.341	0.675	-0.377	-0.507	-0.00915	-0.171	-0.105
	(-0.09)	-0.46	(-0.10)	(-0.23)	-0.02	(-0.05)	(-0.04)	(-0.22)	-0.24	(-0.32)	(-0.34)	(-0.00)	(-0.09)	(-0.09)
inc om e	0.0927* **	0.915 ***	0.199** *	-0.107***	-0.0741	0.122 ***	0.0358	-0.0281***	-0.0104	-0.0259* **	-0.0465***	-0.026	-0.0114	-0.0118
	-4.38	-33.14	-6.16	(-2.73)	(-1.13)	-4.16	-1	(-3.80)	(-0.77)	(-2.99)	(-4.03)	(-1.20)	(-0.90)	(-1.31)
hu ma n	0.0185* **	0.0930***	0.0289	-0.00645	0.0375	0.0264	0.0103	0.00268	-0.00115	0.00186	0.00204	0.0102	0.0024	0.00197
	-3.52	-10.32	-1.42	(-0.26)	-0.89	-1.43	-0.46	-1.55	(-0.37)	-0.34	-0.28	-0.72	-0.3	-0.34
DA 2	-0.0323	-0.0812**	-0.0648* *	-0.0733**	-0.0801	-0.0136	-0.0253	-0.0170*	-0.0504***	-0.0241* **	-0.0208**	-0.0182	-0.0118	-0.0106
	(-1.12)	(-2.40)	(-2.05)	(-1.96)	(-1.46)	(-0.45)	(-0.74)	(-1.67)	(-2.70)	(-2.83)	(-1.96)	(-1.11)	(-0.91)	(-1.25)
DA	-	-	-	-0.0701**	-0.0357	-	-	-0.0206**	-	-	-0.0167*	-0.0119	-	-

1	0.0570* *	0.0862***	0.0791**			0.0567**	0.0526*		0.0457***	0.0221**			0.0229**	0.0128*
	(-2.26)	(-2.91)	(-2.88)	(-2.16)	(-0.75)	(-2.18)	(-1.78)	(-2.32)	(-2.80)	(-2.99)	(-1.81)	(-0.83)	(-2.04)	(-1.73)
MD 1	0.0487	-0.0933	-0.0382	-0.0239	-0.0242	0.078	0.0645	0.0121	-0.0817**	-0.0182	-0.002	-0.00488	0.0331	0.016
	-0.88	(-1.43)	(-0.63)	(-0.34)	(-0.23)	-1.36	-0.99	-0.62	(-2.28)	(-1.12)	(-0.10)	(-0.16)	-1.34	-0.99
Constant	1.640**	9.532***	-1.316**	2.106***	-2.615**	0.700**	-2.027**	0.664***	0.712***	0.625**	0.792***	0.358*	0.556***	0.368**
	-6.56	-30.47	(-4.41)	-5.78	(-4.31)	-2.57	(-6.13)	-7.58	-4.44	-7.79	-7.41	-1.79	-4.74	-4.39
N	1562	1562	1420	1420	1420	1420	1420	1562	1562	1420	1420	1420	1420	1420
r2	0.959	0.938	0.94	0.875	0.715	0.987	0.893	0.969	0.976	0.931	0.829	0.585	0.992	0.864

Appendix Table 3: Baseline Model+ Market Potential+ Neighbor Distance Results- spatial regression models														
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
	Employment	value-added	producer	distributive	personal	social	creative	employment agglomeration	value-added agg	producer agg	distributive agg	personal agg	social agg	creative agg
density	0.0239	1.414**	0.0738	0.778	0.389	-0.0574	0.474	-0.131	0.887***	-0.100	0.289	-0.693	-0.0479	0.102
	(0.05)	(2.23)	(0.11)	(0.77)	(0.20)	(-0.22)	(0.53)	(-0.90)	(3.52)	(-0.53)	(0.89)	(-1.05)	(-0.48)	(0.42)
income	0.0682***	0.269**	0.165**	-0.108***	-0.100**	0.0599***	0.0254*	-0.0231***	-0.00983***	-0.0252**	-0.0467***	-0.0244*	0.00986***	0.0130***
	(10.46)	(18.90)	(14.62)	(-6.99)	(-2.68)	(13.70)	(1.90)	(-12.31)	(-3.19)	(-9.29)	(-8.82)	(-1.73)	(-7.70)	(-3.46)
human capital	0.0176***	0.0381***	0.0346**	0.00957	0.0828**	0.0171***	0.0242***	0.00315***	0.000367	0.00425***	0.00728**	0.0141*	0.00214***	0.00576**
	(5.34)	(8.65)	(5.64)	(1.02)	(3.80)	(7.88)	(2.91)	(3.28)	(0.22)	(2.60)	(2.33)	(1.83)	(2.68)	(2.51)
DA2	-0.0229	-0.0220	-0.0454	-0.0574*	-0.0599	-0.00338	-0.0218	-0.0130	-0.0396*	-0.0202**	-0.0163*	-0.0169	-0.00971	-0.00916
	(-0.89)	(-0.66)	(-1.59)	(-1.75)	(-1.25)	(-0.12)	(-0.72)	(-1.44)	(-2.47)	(-2.65)	(-1.78)	(-1.16)	(-0.82)	(-1.21)
DA1	-0.0341*	0.0143	-0.0478*	-0.0435*	-0.00521	-0.0205	-0.0418*	-0.0124*	-0.0305*	-0.0163**	-0.00928	-0.0102	-0.0149*	-0.00953
	(-1.72)	(0.56)	(-2.18)	(-1.73)	(-0.14)	(-0.95)	(-1.79)	(-1.79)	(-2.48)	(-2.79)	(-1.32)	(-0.91)	(-1.65)	(-1.64)
MD1	0.0772	0.0890	0.0259	0.0252	0.0537	0.103*	0.0774	0.0223	-0.0516*	-0.00655	0.0115	0.00204	0.0359	0.0208

	(1.58)	(1.42)	(0.48)	(0.41)	(0.59)	(1.91)	(1.35)	(1.31)	(-1.70)	(-0.46)	(0.67)	(0.07)	(1.60)	(1.45)
WD2	-0.0676	-0.200**	-0.149*	-0.0692	-0.224*	-0.106	-0.00603	-0.0185	-0.0219	-0.0203	-0.0179	-0.0364	-0.00926	-0.00422
	(-0.97)	(-2.23)	(-1.93)	(-0.78)	(-1.69)	(-1.39)	(-0.07)	(-0.76)	(-0.51)	(-0.99)	(-0.71)	(-0.90)	(-0.29)	(-0.20)
Constant	1.268**	2.645**	-1.155**	1.710***	-2.653**	0.395**	-1.998**	0.500***	0.548***	0.547**	0.662***	0.363**	0.395**	0.299**
	(9.63)	(12.88)	(-7.22)	(7.97)	(-6.14)	(3.15)	(-10.38)	(11.08)	(7.11)	(11.87)	(9.64)	(2.36)	(7.40)	(5.85)
Spatial														
rho	0.110**	0.352**	0.0713**	0.0616***	0.0142	0.233**	0.0413***	0.117***	0.0909**	0.0449**	0.0436***	0.00798	0.142**	0.0441***
	(8.72)	(54.10)	(5.14)	(4.57)	(1.02)	(22.29)	(3.00)	(9.60)	(7.55)	(3.24)	(3.16)	(0.58)	(11.49)	(3.15)
Variances														
lgt_theta	-2.590**	-2.570**	-2.213**	-1.874***	-1.219**	-3.347**	-1.940**	-2.773***	-2.797***	-2.206**	-1.641***	-0.911**	-3.461**	-1.803**
	(-38.29)	(-37.44)	(-31.31)	(-25.12)	(-14.70)	(-51.03)	(-26.33)	(-41.52)	(-41.96)	(-31.06)	(-21.20)	(-10.35)	(-53.40)	(-24.12)
sigma_e	0.0104***	0.0178***	0.0227**	0.0547***	0.344**	0.00270***	0.0423***	0.000896***	0.00269***	0.00164***	0.00639**	0.0503**	0.000378***	0.0032***

	(26.42)	(24.94)	(25.15)	(25.14)	(25.22)	(24.44)	(25.19)	(26.42)	(26.58)	(25.21)	(25.17)	(25.26)	(24.99)	(25.19)
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Appendix Table 4: Baseline Model+ Market Potential+ Neighbor Distance+ Neighbor Factors- spatial regression models														
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
	Employment	Value-added	producer	distributive	personal	social	creative	employment agglomeration	value-added agg	producer agg	distributive agg	personal agg	social agg	creative agg
density	-0.136	1.099*	-0.245	1.037	0.538	-0.238	0.445	-0.0934	0.928***	-0.0581	0.337	-0.664	-0.0394	0.143
	(-0.28)	(1.80)	(-0.36)	(1.02)	(0.26)	(-0.93)	(0.49)	(-0.65)	(3.71)	(-0.31)	(1.04)	(-0.97)	(-0.40)	(0.59)
income	0.008	0.12** *	0.041**	-0.023	-0.26***	0.0061	0.028	-0.0057	0.008	-0.0018	-0.003	-0.046*	-0.006* *	0.0023
	(0.66)	(7.29)	(2.28)	(-0.81)	(-3.62)	(0.98)	(1.09)	(-1.60)	(1.30)	(-0.37)	(-0.32)	(-1.72)	(-2.52)	(0.32)
human capital	0.0129***	0.0286***	0.0224**	0.0204**	0.0619**	0.0120***	0.0225**	0.00439***	0.00281	0.00658***	0.0103***	0.00924	0.00216***	0.00717***
	(3.78)	(6.63)	(3.58)	(2.09)	(2.70)	(5.53)	(2.57)	(4.38)	(1.62)	(3.87)	(3.18)	(1.15)	(2.58)	(2.98)
DA2	-0.0247	-0.0393	-0.0501*	-0.0550*	-0.0597	-0.00882	-0.0225	-0.0130	-0.0389* *	-0.0206* **	-0.0164*	-0.0173	-0.0106	-0.00876
	(-0.95)	(-1.21)	(-1.71)	(-1.70)	(-1.22)	(-0.31)	(-0.74)	(-1.45)	(-2.43)	(-2.74)	(-1.81)	(-1.17)	(-0.89)	(-1.16)
DA1	-0.0352*	-0.0171	-0.0547* *	-0.0488*	-0.00250	-0.0229	-0.0399* *	-0.0132*	-0.0319* **	-0.0167* **	-0.00895	-0.00785	-0.0139	-0.00988* *

	(-1.75)	(-0.68)	(-2.42)	(-1.94)	(-0.07)	(-1.05)	(-1.68)	(-1.92)	(-2.59)	(-2.86)	(-1.27)	(-0.68)	(-1.53)	(-1.69)
MD1	0.0746	0.0530	0.0182	0.0191	0.0838	0.0936*	0.0811	0.0223	-0.0536*	-0.00943	0.0122	0.0119	0.0343	0.0213
	(1.51)	(0.86)	(0.33)	(0.31)	(0.90)	(1.73)	(1.40)	(1.31)	(-1.77)	(-0.66)	(0.71)	(0.42)	(1.53)	(1.49)
WD2	-0.0708	-0.178*	-0.150*	-0.0585	-0.204	-0.105	-0.00669	-0.0151	-0.0200	-0.0204	-0.0161	-0.0320	-0.0114	-0.00224
	(-1.00)	(-2.02)	(-1.89)	(-0.66)	(-1.48)	(-1.37)	(-0.08)	(-0.62)	(-0.46)	(-1.00)	(-0.64)	(-0.76)	(-0.36)	(-0.11)
neighbor pop	0.0324	-0.0473	0.0268	-0.0352	-0.168	0.129***	-0.00527	-0.0118	-0.00390	0.0125	-0.00957	-0.0450	0.0293**	-0.0119
	(0.58)	(-0.68)	(0.36)	(-0.36)	(-0.98)	(3.65)	(-0.06)	(-0.70)	(-0.13)	(0.63)	(-0.33)	(-0.83)	(2.19)	(-0.51)
neighbor income	0.0780***	0.456**	0.183**	-0.0816**	0.144*	0.0781***	-0.0203	-0.0244***	-0.0122*	-0.0297**	-0.0662***	-0.000207	-0.0105***	-0.0196**
	(5.45)	(18.06)	(8.05)	(-2.33)	(1.69)	(9.70)	(-0.66)	(-5.66)	(-1.68)	(-4.86)	(-5.59)	(-0.01)	(-3.43)	(-2.29)
neighbor human capital	0.00148	0.0104	0.00163	-0.0466*	0.114*	0.0123**	0.0269	0.00254	-0.0137**	-0.00490	0.0107	0.0477*	0.00478**	-0.000351
	(0.22)	(1.21)	(0.09)	(-1.75)	(1.87)	(1.98)	(1.13)	(1.27)	(-3.98)	(-1.04)	(1.21)	(2.20)	(2.01)	(-0.05)

Constant	1.020***	4.335**	-1.711**	2.256***	-2.584**	-0.389*	-2.057**	0.608***	0.632***	0.574**	0.806***	0.383	0.253**	0.397**
	(3.35)	(10.78)	(-4.08)	(4.28)	(-2.73)	(-1.78)	(-4.11)	(6.37)	(3.79)	(5.30)	(5.11)	(1.25)	(2.99)	(3.17)
Spatial														
rho	0.0964***	0.240**	0.0374*	0.0594***	0.0144	0.172***	0.0396***	0.104***	0.0904**	0.0340*	0.0332**	0.00609	0.129**	0.0453***
	(7.39)	(23.63)	(2.56)	(4.36)	(1.03)	(13.92)	(2.81)	(8.30)	(7.50)	(2.42)	(2.38)	(0.44)	(10.07)	(3.20)
Variance														
lgt_theta	-2.610***	-2.599**	-2.273**	-1.863***	-1.245**	-3.389***	-1.944**	-2.776***	-2.804***	-2.202**	-1.633***	-0.928**	-3.467**	-1.793**
	(-38.62)	(-38.07)	(-32.30)	(-24.92)	(-14.97)	(-51.73)	(-26.19)	(-41.55)	(-42.02)	(-31.05)	(-21.12)	(-10.49)	(-53.45)	(-23.88)
sigma_e	0.0101***	0.0162***	0.0214**	0.0543***	0.340**	0.00253**	0.0422***	0.000879***	0.00265***	0.00160***	0.00626**	0.0500**	0.000375***	0.00331***
	(26.46)	(25.70)	(25.21)	(25.15)	(25.19)	(24.76)	(25.18)	(26.46)	(26.59)	(25.22)	(25.18)	(25.24)	(25.01)	(25.19)

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XXV. International RESER Conference: Host country impact of services FDI: the case of Visegrad countries

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This paper contains the main results from a work-in-progress research on the impact of three selected services sector FDI on various host country characteristics in the case of the four Visegrad countries. FDI in three service sectors: financial services, ICT-related services and business services are analysed, which differ in terms of their predominant horizontal or vertical nature. We found both the employment effect and export effect being significant only in the case of the predominantly vertical business services FDI. Furthermore, we analysed the impact of financial FDI on the economy, which we found significant for GFCF with considerable country differences especially after the crisis.

1. Introduction

Services sectors have been important “hosts” to inward foreign direct investments (FDI) in former transition economies and among them in Hungary. In the nineties their main aim was to supply the domestic market of the host country with various services, which were unavailable or less developed in the pre-transition era. Thus their main motivation was market-seeking and they can be characterised as horizontal FDI. Starting from around the beginning of the years 2000, more and more FDI projects arrived to Hungary, the main aim of which was to build up export capacities in certain service sectors relying mainly on the abundantly available mid- to high-skilled local labour with relatively low wages – thus the efficiency-seeking motive has become increasingly important for services foreign investors and vertical FDI projects mushroomed. While the host country impact of manufacturing FDI is analysed extensively in various areas, the number of studies dealing with services FDI is much less numerous, especially in fields such as exports or employment and especially in former transition economies.

The main aim of the research is to analyse the impact of FDI on growth, export and employment in selected service sectors of the host country. Three service sectors: financial services, ICT-related services and business services were analysed in the case of Hungary. The three service sectors were selected, because i) they are important host sectors to FDI in Hungary; ii) they differ to a great extent in terms of their export-intensity (export/sales) ratios: business services being highly export-oriented, financial services sell their products mainly on the domestic market, while ICT-related services can be positioned in-between the other two sectors. Furthermore they can be classified as predominantly horizontal (financial), confluent horizontal and vertical (ICT-related) and predominantly vertical (business services).

2. Background: theory and literature

FDI is of outstanding importance for the CEE countries and among them Hungary. FDI inflows have increased in the CEE in the past 20 to 25 years to become the most common type of capital flows. FDI inflows into CEE economies has been a vital factor in the first stage of privatisation, and FDI became the predominant type of incoming capital investment in the first stage of the economic transition. (See among others Holland et al., 2000 or Kalotay, 2010.) This process not only was to facilitate the restructuring and transformation of centrally planned economies but also the privatization process, i.e. the increase of the share of private ownership at the expense of state-ownership. In services, the banking and insurance sector and later other business services became the primary targets of strategic foreign investors, resulting in significant inflows of FDI in these sectors, connected mainly to the privatisation of state-owned banks and insurance companies in the financial sector and to mainly greenfield projects in the other services sectors. Similarly to global processes foreign investors' entry has been geographically/regionally concentrated, and the main investors have come from traditional/strong economic and trading partner countries (from mainly eurozone countries) of the host countries.

The impact of FDI on the host economy is widely analysed. In theory, companies with foreign participation may affect positively the economic performance of the host country. (Blomström, Kokko, 1997) Their role is of special importance in the case of an economy in transition. According among others to Lankes, Venables (1996) FDI has often been viewed as a potential catalyst for the economic transition. It can accelerate economic development and transition from a planned to the market economy. It may increase the production base in a country, which lacks capital and new investments. FDI may increase productivity; it can raise the level of competitiveness. It can transfer technology and know-how and spread managerial and marketing skills by transactions with domestic firms. It contributes to the restructuring of existing enterprises. It may help the development of markets, relevant behaviour of economic agents, a market based business culture and market institutions. However, these positive impacts do not occur automatically. Companies with foreign participation may form a separate island in the economy, having very limited contacts with local enterprises. They may conserve the technological backwardness of the host country by transferring low value-added activities. They may make the host country overspecialised on a few products thus exposing it to an exceeding extent to the business cycles of the world economy. They may cause political problems as well. The responsibility of the economic policy of the government lays in trying to divert the balance towards the positive impacts of FDI. Blomström and Kokko (1997) identified channels for the FDI spillovers, as backward linkages, forward linkages, training of employees and demonstration and competition effects. Venables and Barba Navaretti (2004) distinguish between the impact on the host countries of vertical and horizontal FDI.

Empirical evidence is inconclusive regarding the positive impact of FDI on the host economy. In many cases, empirical analysis could not show a positive and/or significant relationship between FDI and economic growth. For example in the case of studies analysing data for a group of countries, no evidence of a positive impact of FDI on growth is found by de Mello (1999), Crankovic and Levin (2000) or Lipsey (2000)). On the other hand, Borensztein, de Gregorio and Lee (1998) showed, that

the impact of FDI can be positive on economic growth, depending on the level of human capital and on the absorbing capacity in the host economy. If the quality of human capital reaches a threshold level, FDI can significantly increase the rate of economic growth. Hermes and Lensink (2000) presented similar results. They emphasized that not only the level of human capital, but also that of the financial markets must reach a certain threshold level. Greenaway and Görg (2001) over-viewed over 30 empirical surveys on potential positive growth effects of FDI in various countries. One main conclusion of their paper was that positive and negative impacts usually simultaneously affect host economies. The interference of the two may eliminate measurable positive impacts. Majcen et al (2003) drew similar conclusion after an analysis of spillover effects in transition economies. Campos and Kinoshita (2002) found that FDI affected economic growth positively and significantly in the period between 1990 and 1998 in transition economies. Gorodnichenko et al. (2013) showed using firm-level data, that the various channels of FDI spillovers differ in their significance, as well as sectors, FDI source and characteristics of the business environment, education of workers etc. affect the impact of FDI on the host economy. Iwasaki and Tokunaga (2014) prepared a meta-analysis of studies analysing the macroeconomic impacts of FDI in transition economies and found that the effect size and statistical significance of the estimates depend on study conditions: especially the estimation period, data type, estimator, and type of FDI are important factors that affect the heterogeneity of the results. Their main conclusion is that further rigorous research is needed to identify the true effect.

The impact of services FDI on former transition economies is relatively rarely analysed. Generally, Aykut and Sayek (2007) show that the sector composition of FDI has an effect on its growth impact. Eschenbach and Hoekman (2005) found that reforms in services policies result in a higher inflow of FDI into these sectors and thus positively affect the post-1990 economic performance of transition economies. Riedl (2010) found similar results, though she assumed that services FDI is almost exclusively market-seeking. Gorodnichenko et al. (2013) showed that services firms benefit more from FDI. The impact of business services FDI on the local economy, emphasizing the vertical nature of it, was presented by Sass (2011), showing that spillovers are scarce because backward and forward linkages with indigenous firms remain limited. Hardy et al. (2011) compare the local impact of horizontal and vertical business services in the Czech Republic, Hungary and Slovakia. They show the differences in local impact, stating among others that the most salient static impacts of these investments are on the labour market, where horizontal investments provide fewer, but more skilled jobs than vertical investments. Gál (2004) analysed financial services FDI in Hungary from that point of view.

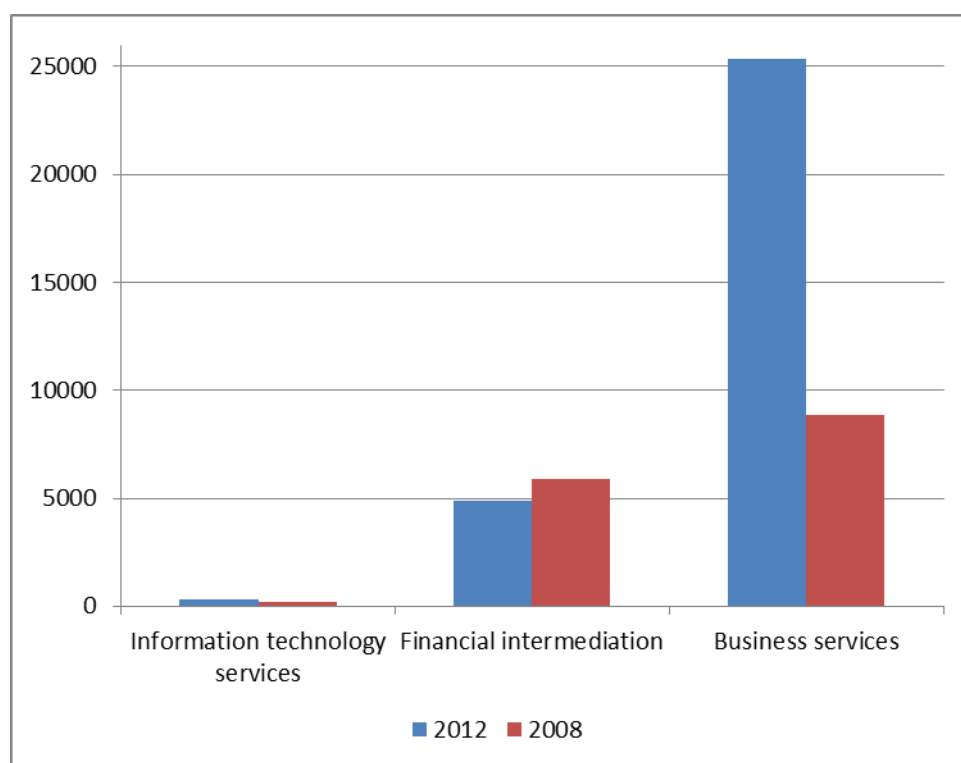
Overall, there are numerous studies analysing the impact of FDI on the host economy, but regarding the nature of that impact, the evidence is inconclusive. On the other hand, there are only a few studies on the impact of services FDI on the host economy, especially for former transition economies.

3. Methodology

Measurement and data problems are especially widespread in services, and in certain services sub-sectors. (See e.g. Sass and Fifeekova, 2011 for business services in post-transition economies.) FDI and export data are especially affected (see e.g.

Pindyuk, 2008 or Francois et al., 2009). The main aim of this section is to analyse the impact of FDI on growth, export and employment in selected service sectors of the host country. Three service sectors: financial services, ICT-related services and business services were analysed in the case of Hungary and the other three Visegrad countries. The three service sectors were selected, because they are important host sectors to FDI. In 2012, business services represented 32.3 % of total inward FDI stock, financial services: 6.2% and ICT-related services 0.4% in Hungary. (Chart 1) These are important host sectors in other CEE countries as well, especially for the other three Visegrad countries: the Czech Republic, Poland and Slovakia. (Sass, Fifekova, 2011)

Chart 1 FDI stock in selected service sub-sectors in Hungary, 2008 and 2012, million euros



Source: Hungarian National Bank, <http://www.mnb.hu/Statisztika/statisztikai-adatok-informaciok/adatok-idosorok/vii-kulkereskedelem/kozvetlentoke-befektetesek/bpm5-modszertan-szerinti-adatok-2013-ig-archiv>

Furthermore, they differ to a great extent in terms of their export-intensity (export/sales) ratios: business services being highly export-oriented, financial services sell their products mainly on the domestic market, while ICT-related services can be positioned in-between the other two sectors. Connected to this, the three selected service industries are different in terms of their horizontal or vertical nature: financial services are predominantly horizontal, offering the same services as in the other home and host countries of the investing multinational (bank or insurance company). At the same time, ICT-related services are confluent horizontal and vertical, where not only the same services are offered, but there is another type of motive and project: where activities are located in the host economy in order to minimise costs and the output is “fed back” into the activity of the multinational company and thus (intra-company) export is occurring. Furthermore, the third selected service industry, business services is predominantly vertical. As a “benchmark”, we also added data on an

important manufacturing sector, playing a significant role in all Visegrad FDI stock and economy: machinery.

As for the methodology, we rely on the analysis of a panel dataset containing time series data for the period 1990/95-2013 on FDI inflows, stock, FDI share on GFCF, sectoral FDI, export and import, employment and various composite indicators proxying the level of development of the analysed services sectors. Using SPSS, we examined how FDI in a given sector impacts upon employment, exports and the other variables. Basically we have chosen two options in the framework of multivariate regression analysis run by SPSS for detecting the sectoral effects of FDI. Both the selected explanatory variables and dependent variables have a sector-related nature. FDI impact can be measured on exports or employment within the selected sectors as OECD database for Visegrad countries with fine data granularity available for analysis. Export and employment in this case are dependent variables. Another option when the sector-specific variables are explanatory variables (eg. FDI inflows into the financial sector), while the dependent variable is selected from macro economic data (e.g. GDP growth rate). The second case is a much stronger argument, which presupposes that FDI has a direct impact on growth, not just on the sector itself, but also has implications for the whole economy. First we examined the FDI effects on the financial, ICT, other business services, and selected manufacturing sectors, then we tested the hypothesis whether financial sector FDI has a much more significant effects on the whole economy. The analysis is performed in three distinct periods (transition: 1994-1999, boom: 2001-2007, crisis: 2008-2011). We expected that on the basis of the theory, that both vertical and horizontal services FDI sectors increase employment and while vertical increases exports, horizontal decreases it.

4. Results

As it was described in the methodology section, we have carried out various calculations on a database containing data for the four Visegrad countries: the Czech Republic, Hungary, Poland and Slovakia. The results of our calculations can be found in Table 1.

Table 1 Impact of FDI on employment and export in different sectors in the Visegrad countries between 2001-2011

Dependent variables	Sectoral employment within the total employment		Dependent variables	Export as % of GDP	
Explanatory variables	p-values	Regression coefficient	Explanatory variables	p-values	Regression coefficient
Financial sector FDI , % of GDP	.919	-.035	Financial sector FDI , % of GDP	.994	-.002
ICT sector FDI FDI , % of GDP	.321	-.351	ICT sector FDI FDI , % of GDP	.087	-.579

Business services FDI FDI , % of GDP	.284	.351	Business services FDI FDI , % of GDP	.034	.645
Machinery FDI FDI , % of GDP	.686	.134	Machinery FDI FDI , % of GDP	.227	.471

Source: FDI: http://stats.oecd.org/Index.aspx?DatasetCode=FDI_FLOW_INDUSTRY

Export:

http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=bop_its_det&lang=en

Employment: OECD:

Labour/Labour Force Statistics/Annual labour force statistics/Employment by activities and status

The analysis tried to assess the magnitude and significance of the impact of FDI in the three selected services sectors and for comparative reasons the one selected manufacturing sector. In the case of employment we cannot find extremely low p-value, which means the FDI inflows do not exert significant influence on the employment growth of the particular sectors. The employment effects of FDI were the lowest in the financial and the automotive manufacturing sectors. The increase of employment in the machinery sector has a low correlation coefficient with sectoral FDI as a percentage of the GDP, which means that due to the huge import generated by local car manufacturing and other assembly plants resulted in a kind of crowding out effect in the labor market as well. This has a direct impact on the domestic supply chain manufacturers which decreased the labour force also in the related industrial sectors (e.g. metal production).

At the same, in the case of the financial sector not only the lack of significance of the correlation between the financial sector FDI stock as a percentage of GDP and employment is the case but the regression coefficient is negative indicating the decrease in financial sector labour force. This is the direct consequence of the general consolidation, technological upgrading and to a large extent the direct result of the crisis affecting heavily the employment of financial sector in the Visegrad countries, and within this group in particular in Hungary.

The relatively the largest p values (although above the 10% threshold) were found in the case of the business services and ICT services. However in the case of business services there is a positive impact on employment growth while negative regression coefficient in the ICT means that FDI increase leads to a decrease in the employment. Although this can be tested by the Granger's causality test in the future, but this negative coefficient is probably the consequence of the less labour intensive character of this particular sector. In the Visegrad countries the expansion of business services is apparent, the number of projects and employment increased substantially in recent years (see e.g. Hardy et al., 2011). Thus we can conclude here that vertical type FDI in services led to an increase in employment, while the horizontal and confluent types there is no such effect detected.

If we move to the examination of the impact of the sectoral FDI on the relative export intensity of the particular sectors we can find much lower p-values indicating the largest significance of FDI in business services (0.034) and in ICT services (0.087). Business services are proved to be the largest export-oriented sector (with the largest correlation coefficient: 0.645) not only in comparison with all the other sectors in question but also with the ICT sector which has a negative coefficient. This means confluent horizontal and vertical FDI in the ICT sector still follow the market demand led strategy (domestic market oriented) and not necessarily leads to export in the ICT

sector, rather, it generates imports. Similar is the case with the predominantly horizontal financial services. On the other hand, the mainly vertical type business services FDI generates exports. These findings are in line with what was expected on the basis of theory, however, for the confluent case a higher positive export impact was expected.

Table 2 *Impact of financial sector FDI on macro-economic performance between 2008-2011*

Dependent variables	GDP growth rate		GFCF	
	p-values	Regression coefficient	p-values	Regression coefficient
V4	.569	-.112	.002	.552
Czech R.	.196	-.555	.036	.786
Slovakia	.264	-.491	.019	.838
Poland	.699	-.180	.469	.331
Hungary	.544	-.280	.083	-.695

Explanatory variable: Share of Financial FDI

Sources: as in Table 1

If we take a closer look at the crisis period the previously mentioned country stability effects can be also applied to Czech Republic and Slovakia where the banking sector did not lose its financing ability even during the crisis. This is verified by positive and significant impacts of financial FDI both on the GNI per capita and GFCF. In the rest of the Visegrad countries financial FDI lost its significant explanatory effects.

Besides labour market and foreign trade impacts we analyzed the macro-economic impact of the financial FDI (as explanatory variables) choosing GDP growth rate, GNI per capita and gross fixed capital formation (GFCF) as dependent variables. (Table 2) Data were available for the period between 2001 and 2011 so we were able to distinguish between the economic boom (2001-2007) and the crisis (2008-2011) periods. Annex tables contain the results of the various calculations. To sum these up, on the Visegrad level we cannot find significant impact of financial FDI on the GDP growth and GNI per capita. We argue that the direct effect of the financial sector on economic growth and development cannot be detected during the period between 2001 and 2008. However, the impact of financial FDI on gross fixed capital formation is not only significant (0.002) but FDI has a positive impact on GFCF. (This is due to the direct financing effect of the banking sector). We can also measure this impact at the level of individual countries. We found positive and significant correlation in the cases of the Czech Republic and Slovakia where the banking sector has the strongest financing effect). In the case of Poland this correlation is non-significant while in Hungary significant and negative. This latter case means that financial FDI in Hungary did not finance the real economy but rather the household consumption. The second concern is that the allocation of foreign capital has been changing during the pre-crisis period as less foreign capital is directed to the private sector (through FDIs, loans) but more inflows are channelled via the public sector (through government bonds, EU funds), which can undermine the potential impact of financial FDI on growth and investments.

5. Conclusion

This paper contains the results of an ongoing research, where we tried to assess the impact of three selected services sector FDI on the local economy in the area of employment and exports in this case of the four Visegrad countries. We have selected three service sectors, which represent a relatively high share of the overall FDI stock on one hand and which are different in terms of being predominantly horizontal (financial services), vertical (business services) or confluent (IT-services) nature. Our preliminary findings are more or less in line with what could be expected on the basis of the theories in terms of the impact of these services FDI on exports: FDI in the sector with predominantly vertical projects, business services has a positive impact on exports, the sector with predominantly horizontal projects, financial services had no effect, while contrary to the findings, the confluent sector, IT-services we could not find a positive impact, which indicates that even in that sector, FDI projects are mainly horizontal and are attracted mainly by the domestic market of the analysed countries. In terms of the employment effect, surprisingly, it is only FDI in the sector with mainly vertical projects, business services, which had a positive impact on employment, while in the horizontal sectors no such effect was traced. This is contrary to the findings of other research.

The second part of the research tried to assess the impact of financial services FDI on the Visegrad countries as a group and at the individual country level. The two main areas analysed were GDP growth and gross fixed capital formation. Here we assumed that financial services FDI has a much stronger impact on the economy as a whole compared to other industries and sectors, via the impact of the financial sector on the economy. We found a positive impact of financial FDI on GFCF in the country group, but individual countries differ to a great extent.

Further research will address the directions of causality and it will include the extension of the variables in order to find more clear explanations about how vertical and horizontal services FDI impacts upon the host economies and overall, what the impact of services FDI can be on host economies.

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Annex tables

1. table The impact of financial FDI on employment

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2,060	,148		13,909	,000
	Financial Sector FDI, % of GDP	-,009	,086	-,035	-,104	,919
	2009 Dummy	,008	,148	,022	,057	,956
	2010 Dummy	-,038	,157	-,099	-,241	,814
	2011 Dummy	,068	,141	,178	,484	,638

a. Dependent Variable: Financial Sector Labour force Inside Full labour force

Table 2 The impact of financial FDI on exports

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	,182	,034		5,406	,000
	Financial Sector FDI, % of GDP	,000	,020	-,002	-,007	,994
	2009 Dummy	-,044	,034	-,459	-1,293	,223
	2010 Dummy	-,042	,036	-,443	-1,178	,263
	2011 Dummy	-,042	,032	-,446	-1,320	,213

a. Dependent Variable: Financial Sector Export, % of GDP

Table 3 The impact of ICT services FDI on employment

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2,088	,184		11,373	,000
	2009 Dummy	-,134	,281	-,183	-,475	,644
	2010 Dummy	,105	,253	,143	,415	,686
	2011 Dummy	,012	,277	,016	,043	,967
	Telecommunication and IT FDI in % of GDP	-,393	,378	-,351	-1,039	,321

a. Dependent Variable: Telecommunication and IT Labour force Inside Full labour force

Table 4 The impact of financial services FDI on exports

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	,723	,161		4,490	,001
	2009 Dummy	-,137	,247	-,195	-,557	,589
	2010 Dummy	,079	,222	,112	,355	,730
	2011 Dummy	-,020	,243	-,029	-,083	,935
	Telecommunication and IT FDI in % of GDP	-,624	,332	-,579	-1,880	,087

a. Dependent Variable: Telecommunication and IT Export in % of GDP

Table 5 The impact of business services FDI on employment

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	2,344	,130		18,007	,000
2009 Dummy	,061	,183	,115	,334	,745
2010 Dummy	,047	,183	,088	,255	,803
2011 Dummy	,025	,195	,046	,126	,902
SSC, other business activities FDI, % of GDP	,013	,011	,351	1,126	,284

a. Dependent Variable: SSC, other business activities, Labour force Inside Full labour force

Table 6 The impact of business services FDI on exports**Coefficients^a**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	2,102	,572		3,678	,004
2009 Dummy	-,006	,805	-,002	-,007	,994
2010 Dummy	,302	,805	,111	,376	,714
2011 Dummy	-,343	,856	-,126	-,400	,697
SSC, other business activities FDI, % of GDP	,119	,049	,645	2,417	,034

a. Dependent Variable: SSC, other business activities Export, % of GDP

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D2: Collaboration, networking and innovation

Chair: Lars Fuglsang

Towards a Multi-level Framework of Collaborative Innovation in Tourism

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Tourism companies share resources and need to collaborate in order to develop and innovate. However, in the literature on tourism innovation, many different types of collaboration can be found, and it is unclear what role they play for innovation. In the growing research field, scholars use such terms as 'tourism network', 'destination', or 'innovation system' or combine some of them. The purpose of this paper is to describe and compare six different perspectives on collaboration and discuss their role for innovation in tourism. The review also discusses the type of mind-set that underpin the different types of collaboration ranging from the more personalized firm-to-firm collaboration to more generalized forms of collaboration with stakeholders within an institutionalized environment.

1. Introduction

Research on innovation in services progresses rapidly as innovation is considered necessary for doing business in constantly changing environments. However, innovation in services has gained importance in research only during the last few decades, and the topic seems underexplored compared to all the attention drawn to how innovation takes place in manufacturing. Innovation can be defined as the realization of new services in an organizational context or the market. There are various ways to understand and analyze innovation, with the main trajectory shifting from Schumpeter Mark I focusing on the role of individual entrepreneurship for economic development (Schumpeter 1934), to Schumpeter Mark II, focusing on the role of R&D for economic development and wealth creation (Schumpeter 1947) towards a broader concept of Schumpeter Mark III (after Schumpeter), where innovation is seen as an interactive process (Lundvall 1988) as well as a 'strategic response to change-processes in the market and society' for sustainable growth and survival of organizations (Sundbo and Fuglsang 2002, 1). As the perspective of innovation as an interactional process becomes more accepted, it raises scholarly awareness of the importance of collaborative innovation, which is the main concept in this paper. While today there is a very large body of literature on collaborative innovation, we still need good ways to integrate these approaches into a conceptual framework of collaboration to understand how innovation takes place in a business and societal context. This paper will contribute to creating such an integrative framework based on the existing literature.

The remainder of the paper is structured as follows. First, the review method used to elaborate an integrated framework is described. Next, some key aspects and definitions of collaborative innovation are explained. Following this, five perspectives on collaborative innovation are discussed with the sixth approach being further de-

veloped. Finally, the six perspectives are integrated into a multilevel framework of collaborative innovation and the contribution of the paper is discussed.

2. Comparing Strategies for Research on Collaborative Innovation

The widening perspective of innovation theory follows a more general shift in organizational theory of the 1960th, when the emphasis is moved from “controlling internal activities to managing external constraints” (Whetten 1981, 1). Richness and variety of research in the ‘new’ paradigm allowed reviewing and creating classifications. Five decades later the debate does not seem to fade away but to attract more interest in the research world. The inter-organizational paradigm, studying a set of inter-connected actors rather than isolated elements, seems to enter a number of disciplines “such as economics, sociology, anthropology, psychology, and political science as well as in organizational behavior, organization theory, and strategic management “ (Smith, Carroll et al. 1995, 9).

Going beyond organizational boundaries allows learning the experience of others. Yet, an increased level of interactions within a field may also cause what DiMaggio and Powell (1983) named isomorphic change. Therefore, quite early research came to recognize the dilemmas of inter-organizational relations and institutional influences (Meyer and Rowan 1977, DiMaggio and Powell 1983), i.e. that collaboration may lead to innovation but also adaption to and engagement in a societal context.

As “recent research (on innovation in tourism) is now reaching a level which is comparable with studies in other economic sectors” (Hjalager 2010, 1), scholars operate with such terms as ‘tourism network’, (Håkansson and Snehota 2006), ‘destination’ (Pearce 2013), or ‘innovation system’ (Mattsson, Sundbo et al. 2005), etc.. Yet, there is a need for an integrative framework that helps us understand the dilemmas, arenas and levels of collaboration. Therefore, the main contribution of this conceptual article is to create such an integrative framework by reviewing recent research literature on collaborative innovation in tourism and as a result, building a multi-level framework that give greater attention to the varied aspects and ambitions in collaborative innovation.

The paper compares six generic strategies for research on collaborative innovation that are relevant to tourism research. The paper is inspired by a similar attempt by Pearce (2013) to distinguish conceptual frameworks of destinations based on exemplary papers. The generic strategies are compared with regards to the main characteristics inherent to each of them. Not all of the six approaches have been used extensively in research about tourism, but where they have, some examples will be given. If possible, the study goes back to a foundational work that describes the main characteristics of the approach. In cases where no foundational work can be identified, a review of a wider spectrum of articles is made in order to point out the main characteristics (cf. Pearce 2013).

This form of review is chosen in order to clarify varied positions in the literature that involves a collaborative approach that are often not clearly distinguished. Furthermore, more specifically, the paper also seeks to discuss how an emerging per-

spective on collaborative innovation in tourism based on a notion of institutional innovation (Hjalager 2002, 2010) can be framed, what it adds to research on collaborative innovation in tourism, and how it can be developed.

The paper provides analysis of each approach by theoretically deducing the main characteristics which are then systematized in a table. The table includes conceptualization of each approach, types of studies predominantly used in research literature, as well as how collaborative innovation is possible in each approach. While the comparison of research strategies is meant to contribute to a better understanding of varied forms of research in studying collaborative innovation in tourism, it also helps us to understand the particularities of an institutional approach to collaborative innovation.

This is a broad, expert-based review where the analyzed literature was gathered by means of snowballing method. The process of picking up the sixth particular collaborative approaches was facilitated by discussions with colleagues making interpretations of the identified literature thematic. Once approaches and exemplary papers were identified, the sample of articles for the review was widened by means of Google scholar search with the key words 'collaborative' plus 'innovation' plus 'tourism'(where possible), picking the most relevant articles published in international journals for the research purposes as well as published anthologies in international volumes. The method selection is caused by the large number of research articles on each approach, which otherwise would make it difficult to seize within the limits of the article in order to construct the unified framework.

3. Collaborative Innovation

Collaborative innovation being seen as one of the ways to perform innovative activities can be defined as “bringing together public and private actors with relevant innovation assets, facilitating knowledge sharing and transformative learning, and building joint ownership to new innovative visions and practices” (Sørensen and Torfing 2012, 1). This definition is derived from studies of public innovation but may also be used for the private sector. The advantage of the definition is that it does not merely focus economic value but innovative visions and practices in a broader sense. The first part of the definition focuses on the interaction of agents involved in the innovation process. The combinations of such interactions will be further discussed in a more detail. The second part of the definition outlines multiple approaches to collaborative innovation such as learning, which is also a research interest in tourism, for instance captured by the notions of Learning Tourism Destination (Schianetz, Kavanagh et al. 2007, Liao, Chang et al. 2010), knowledge sharing (Matlay, Braun et al. 2006, Svetlik, Stavrou-Costea et al. 2007, Baggio and Cooper 2010), or building innovative vision (Bramwell and Lane 2000). These approaches are useful in identifying studies on collaboration without explicit use of the innovation as a term. Finally, the last part of joint management of the outcomes of innovation, the visions and practices, are left for further research.

Tourism as arena for collaborative innovation may be defined broadly as “all those firms, organizations and facilities which are intended to serve the specific needs and wants of tourists” in a given location (Mattsson, Sundbo et al. 2005, 358). These arenas are often characterized by a large number of SMEs (Hjalager 2010),

rather low professional qualification of employees (Rønningen, Lien et al. 2013), seasonal employment, destination development (Shih 2006), and specificity of tourism product and experience-oriented demand (Arnould and Price 1993). Collaborative innovation may be important for developing tourist products from a wholeness perspective, but tourists companies are often small with few resources for networking and large-scale cooperation (Fuglsang and Eide 2013).

Collaboration on innovation can be compared on different dimensions. The collaborative relationships can be formal or informal. Formal ties are usually intertwined with multiple informal connections between companies. The difference can be defined by “characteristics of contractual obligations and formal structures of control” (Smith, Carroll et al. 1995, 10). According to Ring and Van de Ven (1994) formal relations can outgrow formalities and develop into informal type. However, it might also happen the other way round by contracting informal cooperation where ‘behavioral norms’ would be of a great importance (Smith, Carroll et al. 1995).

In addition, cooperation can be local or distanced (global) (Asheim and Isaksen 2002, Bathelt, Malmberg et al. 2004). The difference then often is in ‘place-specific’ coupled with tacit knowledge opposite to ‘world-class’ coupled with codified knowledge. Collaborative innovation can focus exploitation versus exploration, i.e. experimenting with new solutions versus appropriating new inventions (Benner and Tushman 2003, Andriopoulos and Lewis 2009, Sørensen and Fuglsang 2014). Innovation processes are often seen as open because an organization “cannot innovate in isolation” (Dahlander and Gann 2010) but they may also be conflicted and based in mutual exploitation (Obstfeld 2005). There are also parameters characterizing collaboration itself such as network position, goal congruence etc. These characteristics as well as the type of cooperation are important in studying empirical phenomenon of collaborative innovation and will be further reflected in the integrated framework.

In the following section, five understandings of collaborative innovation will be further developed based on a review of the main characteristics of the approaches: dyadic relations, innovative communities, social networks, destinations and innovation systems. Further, the sixth approach of institutional environment is discussed as broader setting for collaborative innovation claiming the potential of sixth form of such cooperation.

3.1. Dyadic Relationships

The concept of dyadic business relationships attributed to earlier works on interfirm collaboration, is a critical form of business relation beyond organizational boundaries. It is an extensive topic within management, marketing and organizational studies, especially within the so-called international marketing and purchasing group (IMP) in international marketing research. Since the discussion on dyadic business relationships takes place from around 1960 to 1990, the main sphere of research is manufacturing with the emphasis on buyer-seller relationships (Dwyer, Schurr et al. 1987), manufacturer-distributor relationships (Anderson and Weitz 1989, Anderson and Narus 1990), and broader exchange relations in marketing (Frazier 1983), interfirm adaptation (Hallen, Johanson et al. 1991), etc.

Looking into dyadic business relationships, Anderson, Håkansson et al. (1994) analyzed a number of studies within the approach providing its further conceptual

development. While not denying a wider environment of a firm, these scholars chose to concentrate on a 'focal firm' and 'focal relation'. They argue that "if business networks are to possess advantages beyond the sum of the involved dyadic relations, this must be due to considerations that take place within dyadic business relationships about their connectedness with other relationships" (Anderson, Håkansson et al. 1994: 1). Studying focal relationships "connected to several different relationships", scholars discuss their functions: firstly, by the essential elements of activities, actors and resources; secondly, by primary and secondary functions. The key difference between the two types of functions is whether positive and negative effect of relationship come from the interaction of firsthand focal firm relation with its partner, or from being (directly or indirectly) connected to other relationships. The outcomes of the two types of relationships may supplement each other. But this is where innovation is first looked upon as an outcome of a user-producer dyad: based on the premises of "interlinking of activities, creative leveraging of resource heterogeneity, and mutuality based on self-interest of actors" (Anderson, Håkansson et al. 1994, 3). Furthermore, innovation may also be an integrated outcome of innovative effects of several dyadic relationships. To which extent a focal firm can be influenced or develop such an outcome must then be dependent on actor's network context, i.e. a 'relevant' part of the network. The key difference between dyadic and network perspectives, scholars define as "the focus on relationship states (e.g., the state of cooperation in the relationship) in the dyadic relationship perspective versus the focus on activities in the network perspective" (Anderson, Håkansson et al. 1994, 7).

Even though later in his work Håkansson mostly operates with the term network, there is still an emphasis on studying network through the lenses of a focal firm perspective (Håkansson and Ford (2002), Håkansson and Snehota (1989), Håkansson and Waluszewski (2013)) with interaction seen as "not just a simple mechanism" but "a specific substance" affecting the involved companies, their activities and resources (Håkansson and Waluszewski 2013, 444). Scholars notice that "no one interaction, whether it is a sale, purchase, advice, delivery or payment can be understood without reference to the relationship of which it is a part" (Håkansson and Ford 2002, 134). The limitation in terms of narrowness of dyadic approach to marketing as well as dyad being interior to "interactions in networks of relationships" is similarly described by Gummesson (2004).

Research literature utilizing the concept of dyadic business relationships is preoccupied with conventional marketing and manufacturing dyads (Frazier 1983, Dwyer, Schurr et al. 1987, Anderson and Weitz 1989, Anderson and Narus 1990, Hallen, Johanson et al. 1991). Ontologically, such dyads are studied through exchange processes of ongoing business relationships characterized as potentially 'long-term' (Anderson and Weitz 1989), 'working' (Anderson and Narus 1990) relationships. Scholarly work to a higher or lower degree involves literature reviews (Frazier 1983, Dwyer, Schurr et al. 1987, Hallen, Johanson et al. 1991, Anderson, Håkansson et al. 1994) that allow developing models (Anderson and Narus 1990, Hallen, Johanson et al. 1991) and frameworks (Frazier 1983, Dwyer, Schurr et al. 1987, Anderson and Weitz 1989) of such exchange relationships. It is likely to be explained by the attempt of developing success factors of "lasting exchange relationships" in business markets that are often developed in business markets (Hallen, Johanson et al. 1991, 29). Some of the studies also provide quantitative evidence in support of the hypotheses underlying the models and frameworks (Anderson and Weitz 1989, Anderson and Narus 1990, Hallen, Johanson et al. 1991). Reputation, trust, commitment, common goals and dependence are found to be among key char-

acteristics of long-lasting dyadic interfirm relationships. Innovation, in neither narrow nor wide interpretation, is not discussed in the early studies of the approach; unless potentially seen through early concepts of value-adding functions, value-chain or value-adding partnership.

Summarizing main characteristics of the approach that are common across research literature, dyadic business relationships is long-lasting cooperation of two companies built on trust and driven by self-interest of each company in a dyad. Being important as pioneering approach to inter-organizational relations, it can be found fragmented in a sense of leaving behind all the complexity of business relationships beyond dyadic boundaries.

Since the maturity of tourism research and particularly innovation in tourism has only been gained over the last two decades, scientific work utilizing the approach of dyadic business relationships in tourism is modest (Sautter and Leisen 1999). Empirical studies, however, often provides evidence of dyadic ties being essential for long lasting and informal tourism collaboration.

3.2. Communities-of-practice

The community of practice approaches to networking and inter-organizational collaboration are based on the community of practice literature (Newell, Robertson et al. 2009) stressing the connections between working, learning and innovating within a community of practitioners (Brown and Duguid 1991). Hence, innovation and learning emerge from practice rather than they are prior to practice. Communities-of-practice emerge spontaneously among the individuals sharing similar activities and/or interests across organizational units, or even across organizational boundaries.

Such communities are first of all seen as social learning systems (Wenger 1998, Wenger 2000) meaning that the learning occurs by a number of engaged individuals constructing solutions to common challenges, creating and communicating knowledge in practice. Therefore, ontologically communities-of-practice represent dynamic knowledge resources (Wenger 1998) or resources of adaptive learning processes (Tyre and Von Hippel 1997). Empirical insight is essential examining the concept as it allows to study the actual practices as well as to define the key features of the concept (Tyre and Von Hippel 1997, Swan, Scarbrough et al. 2002). Once such communities are discovered by an organization, a question of manageability and nurturing of knowledge creation and learning arise (Wenger 2000, Swan, Scarbrough et al. 2002). Though innovation is directly addressed in research on communities-of-practice (Brown and Duguid 1991), it is addressed in terms of rather incremental innovation, improvisation, adaptation and bricolage. While later research points at radical innovation frequently occurring at the interstices across communities (Swan, Scarbrough et al. 2002).

Earlier works on communities-of-practice are mostly preoccupied with studying managing technologies within an organization (Brown and Duguid 1991, Orr 1996, Tyre and Von Hippel 1997). However, the very characteristics of such communities as being fluid and interpenetrative (Brown and Duguid 1991) explains their potential for business relations across organizational boundaries. Besides, physical context of

such human interactions plays an important role and may enhance learning (Tyre and Von Hippel 1997).

Going beyond the community, developing working knowledge between organizations or across communities, may happen owing to 'boundary-spanners' (Newell, Robertson et al. 2009). According to Newell, Robertson et al. (2009) these are "highly connected people" utilizing connections both within the community they belong to and linking similar representatives engaged in the same social practice in other communities. They play entrepreneurial role, opening up relatively closed group of the community to novel information and in some cases to innovative activities.

A similar concept that might potentially add to the communities-of-practice is the innovative milieu approach that evolved around 1990. The core idea of collective learning processes and communal synergy makes it allied but at the same time enlarged, in terms of inter-organizational cooperation, approach. Innovative milieu is characterized by "collective learning process, fed by such social phenomena as intergenerational transfer of know-how, imitation of successful managerial practices and technological innovations, interpersonal face-to-face contacts, formal or informal cooperation between firms, tacit circulation of commercial, financial or technological information" (Camagni 1991, 1). In tourism context, Fuglsang and Eide (2012) discuss practice based approach that emphasizes "the integration of networks into pre-existing local social structures that facilitate learning and innovation" (13). Instead, their practice-based model conceptualized as a bandwagon metaphor contributes to ongoing discussion by explaining how the concept of experiences can be translated into network formation and innovation.

The main characteristics of the communities-of-practice common across research literature is their bottom-up formation based on joint learning by practicing common social task. Interweaving of working and learning produces community-specific tacit knowledge. These characteristics can turn out to be both an advantage and a limitation for a member of such community since concentrating on a particular social practice developing tacit knowledge may facilitate omission of codified knowledge transmitted over distances through broader information flows.

3.3. Social Network Approach

Alternatively to studying networks emphasizing "the importance of shared practices and understanding amongst the members of the community" that are essential for shared learning, there is also more static quantitative approach focusing on structural configurations of network serving as "channels for the flow of knowledge" instead. (Newell, Robertson et al. 2009, 165, 166). Usually serving as a more formalized tool, social networks are studied as a type of spacious collaboration.

An approach of social network has been successfully utilized in tourism research. Evolution-wise, it takes its roots from a network theory build on a premises of nodes and ties. In Granovetter's well-known theory of the strength of weak ties (1973), he studied the connection of smaller interpersonal networks to larger structures. He argues that if there is a strong tie between the two individuals A and B, and B and C, then there is most likely at least a weak tie between A and C. Providing a qualitative description of strong and weak ties, Granovetter opens a potential for quantitative studies. Studying the importance of strong and weak ties, Granovetter

also introduces the concept of a “bridge” between A and B, i.e. “the only route along which information or influence can flow from any contact of A to any contact of B, and, consequently, from anyone connected indirectly to A to anyone connected indirectly to B” (1973, 1364). Granovetter’s focus on various kinds of ties points at the weakness of sociometric techniques: that is “there is almost never an attempt to directly retrace the exact interpersonal paths traversed by an innovation” (1973, 1366). The main message of Granovetter’s theory is that individuals are “closely bound up with larger-scale aspects of social structure” with weak ties providing opportunities for their integration into communities as well as serving as the channels for ideas, influences and information socially distant from such individuals (1973, 1377, 1370).

Borgatti and Halgin (2011) discussing network approach also refer to Burt’s structural holes theory (1992) as fundamental. Summarizing the theory: “ego networks—the cloud of nodes surrounding a given node, along with all the ties among them”, meaning that not the number of ties but the way they are organized might be decisive for receiving more nonredundant information, and as a result, the capability of performing better or being perceived as the source of new ideas (Borgatti and Halgin 2011, 113). In line with our interpretation, Borgatti and Halgin (2011) point at both theories aiming at sharing new ideas and information as the key feature of network formation: “the concept is the same and so are the consequences: more novel information” (1171). A ‘social’ constituent of a network naturally comes from a growing area of literature on social capital which in management describes network by creativity, performance, entrepreneurship, mobility, power, etc.

The analysis of literature on collaboration on the level of social network in tourism provides following results. The main categories which scholars operate with are network, including social network (Borgatti and Foster 2003), complex social network (Miguéns and Mendes 2008); tourism destination (Shih 2006, Baggio, Scott et al. 2010), clusters (Erkuş-Öztürk 2009) and diagonal clusters (Novelli, Schmitz et al. 2006). Ontologically, networks are seen as a set of actors/nodes denoting people, companies etc. connected by a set of ties/edges/relationships (Borgatti and Foster 2003, Novelli, Schmitz et al. 2006, Miguéns and Mendes 2008). While other scholars may describe network elements similar, they emphasize also other characteristics of a network such as complexity and adaptive features (Baggio, Scott et al. 2010) or seeing it in a wider setting of economic, cultural and social activities within destination (Shih 2006). Among works reviewed, case-study is the most common way of approaching data collection (Novelli, Schmitz et al. 2006, Shih 2006, Erkuş-Öztürk 2009, Baggio, Scott et al. 2010) besides conventional review of research literature (Borgatti and Foster 2003), statistical data (Miguéns and Mendes 2008). Social network analysis is prevalingly used as tool of analyzing network features quantitatively, while very few point at the necessity of qualitative analysis for a sound case description and, as a result, findings. Recent work by Hoarau, Wigger et al. (2014) can be one of the few examples combining quantitative and qualitative methods. No similar findings across reviewed articles could be found: some arrive to a low degree of collaboration detrimental for innovation (Baggio, Scott et al. 2010), while others draw their conclusion depending on the scale of network under investigation. Among others, Novelli, Schmitz et al. (2006) find positive impact of collaboration on improved quality, enhanced visibility, cross/marketing activities etc. Yet, in most (but one) of the reviewed articles innovation is seen as a benefit (Erkuş-Öztürk 2009) or outcome of networking: through learning (Borgatti and Halgin 2011), knowledge and information transfer (Miguéns and Mendes 2008, Baggio, Scott et al. 2010).

Similar to overall research claims on benefits of networks for innovation being manifold, research on tourism networks and innovation is said to be weakly integrated across research areas and deprived empirical prove of benefits. Van der Zee and Vanneste (2015) review distinguishes four major research areas within the studies on tourism networks: business networks, policy networks, 'co-opeting' networks, and network configuration; which require scholarly attention to diffusion across the areas as well as more empirical insight into the outcomes of networking.

Summarizing research finding, social networks are commonly understood as structural configuration of nodes and ties serving as channels through which learning, knowledge sharing can be transmitted. Statics and quantification in network approach is both theoretically beneficial in terms of visualization as it allows creating models and frameworks, but also limiting in terms of few dynamic qualitative descriptions (Ahuja, Soda et al. 2012, Sørensen and Fuglsang 2014). Though creating and sustaining networking activities for tourism companies is claimed to be favorable, it also implies costs that may demotivate some of them.

3.4. Destination

There are a number of scholars both within economic and sociological disciplines that would discuss tourist destinations as the environment potentially rich for collaboration about innovation. Particularly this concept is widely used in tourism research, and it pulls together some of the features of both the communities of practice approach and the social network approach in a not very clear way. The streams of the research on destination include destination management and marketing, and destination development. Destinations are also studied from various perspectives: tourists, stakeholders, Destination Marketing Organizations (DMOs), and other public actors. The scope of research on destination is simply so broad that it won't allow to go in-depth but rather to refer to some of the generalizing works as well as to provide the directions useful for the purposes of the study.

Wide application caused ill-considered understanding of destination as 'the heart of tourism' (Leiper 2000). Thus, there have been a number of attempts to reach consensus on what a destination is. One of such attempts is made by Framke (2001), who describes a complexity of finding a unified meaning of destination, first of all, because of the controversy in understanding of destination's main attributes: physical boundaries, content, co-operation, and tourist behavior. He concludes that the destination is not only a static but also a dynamic phenomenon where "interaction, cooperation, networking and social practice are crucial activities describing a 'destination', it's content, it's relations and it's tourists" (Framke 2001, 2). This line of research is surely not exhausted nowadays. Haugland, Ness et al. (2011) develop an integrated multilevel perspective on destination underlining that research emphasizes only on some of the areas of destination development. They view a destination through prism of destination capabilities, intra- and inter-destination ties; emphasizing the importance of collaboration for the development of destinations, especially inter-destination bridge ties, that are important among others for imitation innovation. Among recent works integrating various destination perspective is also one by Pearce (2013), who reviews the concepts of industrial districts, clusters, networks, systems social constructs applied to destinations. The key features of these concepts allow to develop an integrative framework consisting of geographic dimension, mode of production and dynamic dimension. What all the concepts seem to share is inter-

dependencies and need for cooperation within a specific location, which is also seen as a source of innovation, particularly in local cluster approach. The latter approach has also been stressed by Nordin (2003): “the interdependence of attractions, services, transportation, information and promotion highlights the need for collaboration and it is evident that companies located in a destination have a lot to gain from being located in a close proximity” (17).

Collaborative innovation within a destination is a promising research area uniting few different streams. Firstly, the destination development stream of literature including development of both companies and destination itself with its “inherited business traditions, specific infrastructures, competences and skills and trade systems” (Hjalager 2010) proved the collaboration being important. Secondly, collaboration is important in destination marketing research (e.g. Buhalis (2000), Jensen and Korneliussen (2002), Mossberg (2007), also with innovation research angle Hjalager (2010), Nordin (2003). The marketing research confirms that tourists do not perceive one separate business or one separate attraction but rather a complex of attractions or conditions within a destination as they make up the experience or impression in a synergy (‘total experience’), thus representing “an integrated system in a limited geographic area” (Nordin 2003). And thirdly, an important stream of experience-based literature discussing sophisticated market demand challenging tourism companies has also echoed on collaborative innovation within the destination (Arnould and Price 1993, Sørensen 2004, Mossberg 2008, Eide and Fuglsang 2013).

Thus, a number of studies of destination share common understanding of networking within a particular geographical space directed to the construction of a tourist destination, i.e. filling the geographical space with meaning and experiences. The place-specific characteristic makes tourism companies share common vision and interests facilitating collaboration and specifically collaborative innovation.

3.5. Innovation Systems

Among the first scholars using ‘national system of innovation’ (NSI) were Bengt-Åke Lundvall and Christopher Freeman in the late 80th- early 90th , then some major books on national innovation systems followed (Edquist 1997). Since then, works on innovation systems of different scale have multiplied significantly. Not being a theory on its own right, systems of innovation approach rests on such theories as interactive learning theories, evolutionary theories or innovation theory (Edquist 1997). There are concepts of national (Edquist and Lundvall 1993, Nelson 1993), regional (Cooke, Uranga et al. 1997, Doloreux 2002) and local innovation systems (Cassiolato and Lastres 2000, Mytelka 2000); also sectoral systems of innovation (Nelson and Rosenberg 1993, Malerba 2002) and technological systems (Carlsson and Stankiewicz 1991). Defining the approach, similar to Edquist (1997) examining systems of innovation, one must look into the components constituting it. Firstly, the concept is delimited by either geographical or sectoral/industrial dimension. Secondly, systems represent a set of institutions and their interactions defining innovative potential of the dimension they represent. Besides being an approach rather than a theory, Edquist (1997) distinguishes eight more common features of systems of innovation: innovation and learning at the center, holistic and interdisciplinary perspective, historical perspective, differences between systems and non-optimality, interdependence of system’s actors and non-linearity , variations in the concept of innovation, central role of institutions, and conceptual diffuseness (15-29).

NSI approach originates in examining the advances of national economic growth and appreciating the role of institutions and particularly state. It is based on comparative studies of national systems of innovation (Nelson 1993, Wong 1999), also regional innovation systems (Asheim and Coenen 2005) aiming at formulating policies stimulating growth and development. The knowledge generated during two and a half decades becomes subject of further theorization and conceptualization. For instance, Edquist (2004) discusses the potential of NSI to become more theory-like, which it is not due to the lack of “conceptual precision, clarity and a clear identification of independent and dependent variables and their relation to one another” (486). While Lundvall (2007) criticizes attempts to make the concept ‘more rigorous’ by identifying activities or functions influencing innovations. Carlsson, Jacobsson et al. (2002), discussing innovation systems, point at vagueness of the approach in terms of the level of analysis, system’s boundaries and particular hardships in studying performance of such a system.

Remarkably, there’ve been studies conducted examining and conceptualizing tourism through the lenses of innovation systems (Mattsson, Sundbo et al. 2005, Prats, Guia et al. 2008). As noted by Mattsson, Sundbo et al. (2005) innovation systems theory is developed in relation to technology-laden manufacturing sector, and should be distinguished from innovation in services which is “more social or organizational in nature” (358). Sundbo and Gallouj (2000) argue, for example, that innovation system in services are loosely coupled frameworks. Tether and Metcalfe (2004) argue that innovation systems in services evolve around a problem as a focal device. Studies of tourism industry based on the approach of innovation systems inherit ‘systemic’ component in the interactions within “the network of institutions in the public and private sectors” (Freeman 1987, 1), dynamic nature of which “requires continuous learning in order to adapt to challenges” (Soete, Verspagen et al. 2010, 18). Even though, the above-mentioned studies use different definitions of systems, they share common understanding of tourism companies being set in a wider environment especially important in terms of interactive purposes concealing resource and learning potential essential to predominant number of SMEs in tourism.

Thus, common understanding of systems of innovation approach in the research literature is that appreciating systemic features of innovation process it tends to analyze factors at the macro-level that owing to multiple interdependencies can support and facilitate innovation in and between companies at the micro level through various innovation policies. However, the limitations of the approach appear twofold (Soete, Verspagen et al. 2010): firstly, national innovation policy becomes limited as a consequence of globalization processes; secondly, the concept of classic innovation process based on R&D becomes limited as a result of the developments in modern communication technologies and internet information flow.

3.6. Institutional Environment

Vast variety of research on collaborative innovation discusses inter-organizational relations both narrowly (dyadic business relations) and broadly (continental innovation system (Freeman 2002). However, the development of the approaches on collaborative innovation shares similar logic. That is institutional embeddedness, common understanding of the necessity of opening up and interacting with one’s environment in order to secure sustainable business development. This development trend was pointed at as early as by Granovetter (1973), who identified the

weakness of micro-level interactions not being related to macro-level interactions “in any convincing way” (1360). The contribution of the research that followed has covered the gap to a high degree, explaining the embeddedness defined as “to be anchored in a larger structure” (Johannisson, Ramírez-Pasillas et al. 2002, 297) and systemic character of interactions with one’s institutional environment. However, the appreciation of such environment in different concepts is not equally high: it grows with the growth of the scale of interactions from business dyad towards innovation system studying broader set of stakeholders influencing business and deeper integration into interactive processes. To support this argument, institutional economics applied to the approach of innovation systems have been introduced by Johnson and Lundvall (1992) where they discuss institutional set-ups in relation to national innovation system. However, one can still find a call for the necessity of further development of the concept of ‘embeddedness’ of economic activity of a local firm or local network (Johannisson, Ramírez-Pasillas et al. 2002).

We thus suggest another approach to collaborative innovation to be discussed in broader societal context which we call institutional environment. That is so because companies in general, and tourism companies in particular, face the necessity of collaborating beyond local networks with institutions and organizations in other areas of the environment, especially those affecting information flow, learning, and exploring. Types of environments can be conceptualized in different ways. They can be discussed scope-wise as micro-, meso- and macro-environment (Prats, Guia et al. 2008). Some scholars identify various dimensions crucial for innovative capacity of tourism companies, such as political, economic, technological, social and historical (Prats, Guia et al. 2008); while others go in-depth studying types of institutions influencing collaborative innovation in a particular dimension, similar to political dimension by Hall and Tribe (2003). Buhalis, Fletcher et al. (1995) discusses relationship of tourism industry and its environment economic-wise: considering interests of tourism enterprises, tourists, tour operators, host populations, and public sector and government. Other scholars emphasize the distinction between local versus global cooperation being crucial for collaborative capacity (see above, e.g. (Asheim and Isaksen 2002, Bathelt, Malmberg et al. 2004).

Thus, the approach looks upon collaboration of tourism companies as active members of society (rather than just proximity-based collaboration), where negotiations set or alter general course of economic action, settling conflicts and entering agreements. Theoretically, the development of the approach is based on institutional theory within organizational, or more specifically inter-organizational, field (Meyer and Rowan 1977, DiMaggio and Powell 1983, Oliver 1991). That is the stream of literature discussing how an organization adjusts to the rules and values existing in institutional environment in order to gain legitimacy or other benefits: studying types of isomorphic behavior, changes of organizational structure, strategic responses to institutional processes, etc. seeking “legitimacy, resources, stability, and enhanced survival prospects” (Meyer and Rowan 1977, 340). In the institutional setting laden with own routines and habits, organizations change causing at least incremental innovation. However, once organizational field has emerged, an interesting paradox of wide homogeneity among organizations arise (DiMaggio and Powell 1983). Meaning isomorphic behavior of any kind (coercive, mimetic, or normative) does not only lead to change but also to stabilization, posing a dilemma for research on innovation: whether institutional settings facilitate or also hamper collaborative innovation. This dilemma is discussed as ‘convergence’ by Borgatti and Foster (2003), who explains it by belonging to the same business environment with its stakeholders network.

Once institutional theory explained how institutional arrangements influence an organizational field, it offered limited explanation of how institutional arrangements are created, i.e. "limited theory of action" (Fligstein 1997, Maguire, Hardy et al. 2004). Projected on tourism research, that is how innovative behavior of tourism companies can be realized in broader societal context. Institutional entrepreneurship is a steam in the research literature that tends to cover the gap (Fligstein 1997, Maguire, Hardy et al. 2004, Svejenova, Mazza et al. 2007). It explains how social actors may influence and contribute to institutional arrangements. Institutionalization of an environment is a result of ongoing negotiations of different institutions and organizations that agree on a common course of actions. In tourism industry, examples of such course could be total experience within a tourism destination. That is intention of tourism companies, destination management organization, local municipality and local community and other interested organizations to fill the space with meaning, to tell the story, to link separate attractions and experiences together offering a package satisfying the criteria of a tourist's stay in a specific destination. Thus companies, collaborate adapting to the established common course changing their products and organizations, altering their strategies, innovating incrementally or radically and thus, at the same time contributing to current institutional settings.

Research finds evidence of companies differing in the ability to influence institutional settings (Fligstein 1997). While some companies have 'stronger' social skill, i.e. are able to undertake strategic action forming common identities within the field, while others have to adhere to it in order to stay legitimate and competitive. Whether an organization can sustain and further develop the common trend depends also on its ability to justify its actions. In its turn, the ability to justify is argued to be dependent on one's engagement into the environment: from simply being familiar, on to a planned action and further on to the regime of justification with "collective conventions of common good" (Thévenot 2001). Both components constituting good social skill as well as activities of institutional entrepreneurship may differ depending on the status of a particular organizational field, i.e. whether it is "forming, stable or in crisis" (Fligstein 1997, 398) defining the potential for institutional change. Thus, Maguire, Hardy et al. (2004) identifies three critical activities of institutional entrepreneurs in emerging fields: "the occupation of "subject positions" gaining legitimacy and bridging various stakeholders, "the theorization of new practices", and "institutionalization of these new practices" (657). Svejenova, Mazza et al. (2007) describes the qualities that facilitate abilities of strong institutional entrepreneurship through four 'mechanisms' of creativity, theorization, reputation and dissemination based on a longitudinal case-study of chef-owner of a Spanish restaurant.

Similar to institutional entrepreneurship aiming to explain the emergence of institutional arrangements, a collective action model of institutional innovation was developed by Hargrave and Van de Ven (2006). They discuss the action model among other three models of institutional change. Unlike design, adaptation or diffusion of institutional change, collective action model describes institutional change as a result of interactions of the field's actors through dialectics, namely conflict, power and politics (Hargrave and Van de Ven 2006).

Though institutional change has been discussed in research literature for about four decades (Meyer and Rowan 1977, Fennell 1980, DiMaggio and Powell 1983), examples of institutional innovation in tourism are not articulated enough. Among few examples of institutional innovation in tourism, are "new rules of the game" changing institutional course by Hjalager (2002, 466). Hjalager (2010) defines

‘institutional innovation’ as “new, embracing collaborative/organizational structure or legal framework that efficiently redirects or enhances the business in certain fields of tourism”(3). Such all-embracing change happens across sectors and may echo on more than one organizational field.

Sound theoretical basis described in this section, provides potential for further theoretical development of the approach of institutional environment to study collaborative innovation in tourism. Institutional environment is, thus, an action oriented approach where interactions are ‘built’ in broad societal context where adherence to institutionalized course legitimacy, resources and competitiveness of tourism companies.

4. Discussion

As discussed above, all approaches are characterized by specific features summarized in the table below. The table consists of three column: conceptualization, methodology and innovation. The conceptualization column summarizes fundamental features of the approaches. The methodology column describes the predominant methodology chosen in the reviewed articles: quantitative or qualitative. The last column to the right describes the way innovative collaboration is possible in studying inter-organizational relations using different approaches.

Approaches	Conceptualization	Methodology	Innovation
Dyadic relationships	Long-lasting cooperation of two companies built on trust and driven by self-interest of each company in a dyad	Quantitative and qualitative	Innovation can emerge from dyadic interactions of two companies through their close, historical interaction, and their self-interest
Communities-of-practice	Bottom-up formation based on joint learning by practicing common social task. Interweaving of working and learning produces community-specific tacit knowledge	Qualitative	Innovation can emerge in practice-based communities centered around the learning and development of a specific practice
Social network approach	Structural configuration of nodes and ties serving as channels connecting both localized and more distanced businesses	Mainly quantitative	Innovation activities are embedded in various types of networks that function as 'channels' of exploitation and exploration
Destination	Networking within a particular geographical space directed to the construction of a tourist destination, i.e. filling the geographical space with meaning and experiences	Mainly qualitative	Innovation takes place in local geographical places where public and private actors collaborate to construct tourist destinations

Innovation systems	It tends to analyze factors at the macro-level that can support and facilitate innovation in and between companies at the micro level through various innovation policies	Qualitative and quantitative (mainly descriptive)	Innovation activities in companies are supported by policy initiatives. Innovation systems in services may emerge as loosely coupled structures or around problem-areas that function as focal devices
Institutional environment	Interactions are 'built' in broad societal context where adherence to institutionalized course provides with legitimacy, resources and competitiveness	Theory-laden, often case-study-oriented	Innovation takes place in a societal context and involves societal and political conflicts that companies can be progressively engaged in leading to a change of the institutionalized environment

Table 1 Summary of the main findings of the reviewed literature on collaborative innovation

Appreciating the development of the theory of inter-organizational relations towards openness and interactivity of the businesses with their institutional environments, among others led to formulating and developing concepts of business dyad, community of practice, network, destination, system of innovation, and institutional environment. Taking on holistic retrospective view and analyzing the logic and major outcome of such development especially in terms of collaborative innovation, we shall now introduce the integrated framework.

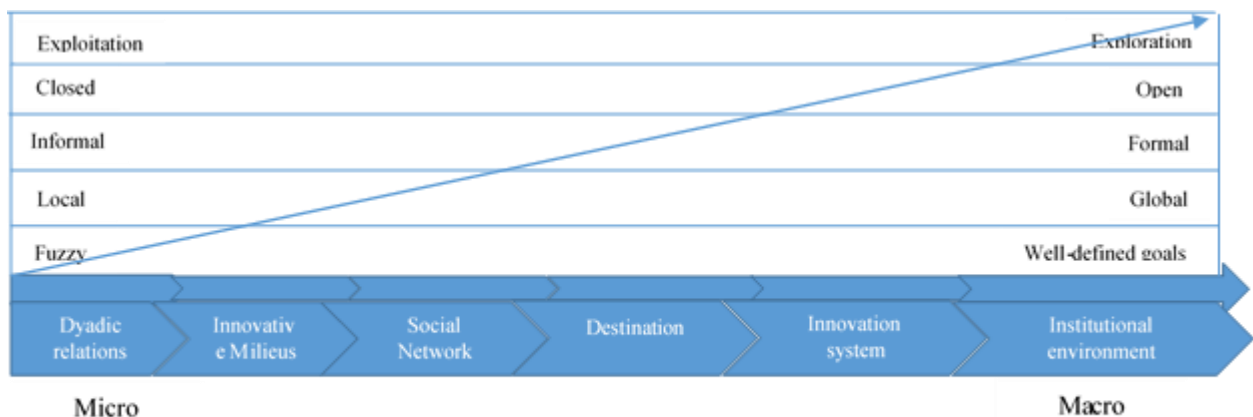


Figure 1 Integrated framework of approaches to collaborative innovation

By this figure, we frame the logic of the development of approaches to inter-organizational relations. The main contribution of such review is in systematizing approaches relative to micro-, macro-environment scale that tends to describe both the number of stakeholders involved, the depth of such relations, as well as the environment influencing collaborative innovation. In other words, different kinds of collaboration may imply different innovative potential. Thus, the fundamental part (bottom continuum line) of the figure starts with the dyadic relations describing collaboration between two companies that is usually long-lasting relationships built on trust. Such collaboration may sometimes result in incremental innovation. Similar to dyadic relations, 'bricolage' concept of innovation improving shared practices by a larger number of actors defines its second position in the figure. The next approach presented in the figure, is social network approach. It implies opportunities for both incremental innovation when taking part in localized networks as well as radical innovation resulting from collaboration with more distanced businesses. The approach of destination

follows social network approach because even though collaborative innovation here takes place in a specific geographical space, it usually includes quite vast areas with significant numbers of members including both private and public actors. Innovation systems approach is presented next as it is a systemic approach to facilitating collaborative innovation at the micro-level by macro-level policies implying involvement of a large number of institutions and organizations at different levels. Finally, the sixth approach of institutional environment, following innovation systems approach, implies the broadest potential for collaborative innovation described by institutional embeddedness of businesses with the potential of changing institutional arrangements.

This logic is also reflected in the width of the cells framing each approach on the bottom continuum line. That, in no circumstances, depreciates any of the approaches and their theoretical or empirical use. Quite opposite, in some cases studies built on fewer empirical units may become an important source of knowledge about the phenomenon of collaborative innovation. What we intend to do is to warn against hasty judgments as a consequence of casting aside institutional setting. In defense of such a 'sliced' study, Lundvall (2007) emphasize on importance of understanding "how the core of the innovation system is embedded in the wider set of institutions" that is "firms in interaction with other firms and with the knowledge infrastructure. (31, 14).

The framework does not exclude the opportunity of studying smaller collaborative unit through the lenses of the wider collaborative approach. That also applies to institutional environment approach. For instance, collaborative innovation in tourism dyad can be considered in the context of interactive processes within a destination. The boundaries between the approaches are, however, fuzzy. This must be explained by the heterogeneity of definitions found in research literature. This does not only apply to each following approach. As for instance, some may argue the approach of institutional environment being an extension of the innovation systems approach that is "an institutional conception, par excellence" (Nelson and Nelson 2002, 265). While we would reserve its right as a separate approach to collaborative innovation developed to reduce the limitations of other approaches (as mentioned above). It also applies to fuzziness when a collaborative unit of one approach is appropriated as case of the following. Here, an example could be fuzzy definition of destination, which some researches place it into the domain of a local innovation system (Flagestad, Hope et al. 2005).

The buildup part of the figure serves as directing in research on collaborative innovation, describing the growth of innovative potential through exploration, openness to both local and global knowledge and respective access to resources, purposefulness, as well as being a part of both formal and informal inter-firm collaboration. The main idea here is that the combination rather than one particular type of collaboration would be the most favorable for innovation (Sørensen and Fuglsang 2014). That is in practice, tourism companies may benefit from different kinds of collaboration. However, it is not always possible in regard to limited resources of tourism companies which are mainly small and medium enterprises.

As for the further research, it is important to find out how a local company or local network is embedded within wider institutional settings that are to a various degree supportive for innovative activities. Following Lundvall's (2007) reasoning: life-style entrepreneurs with moderate business skills, often in charge of small tourism companies, may need stimulation and training in order to facilitate development and

innovativeness of their companies; while sometimes a tourism company may develop at more rapid pace making changes in institutional course necessary. Therefore, it is important to know which institutions and how (which interactive processes) influence collaborative innovation of tourism companies with respective empirical examples.

Leaving tourism industry, it is also interesting to learn about the potential of the approach of institutional embeddedness in other areas, because “different sectors contribute differently to innovation processes” (Lundvall 2007, 14) including interactive innovation. Learning about what institutional set-up prove to be more favorable for a single company or industry (Hirsch 1975, Prats, Guia et al. 2008) can also provide an illustrative example for practitioners. As “fields only exist to the extent that they are institutionally defined” (DiMaggio and Powell 1983, 148) with the paramount importance of interactive processes between organizations and institutions within a particular organizational field.

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XXV. International RESER Conference: Evaluation of design thinking for the creation of service innovations in developing countries

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The constantly growing services sector in developing countries has the potential to sustainably contribute to the people's well-being and foster overall development. This especially applies to educational and health care services whose demand and supply often do not fit due to non-existing or traditional, product based marketing instruments in use. In response to this misfit, we propose to employ design thinking methodology. Therefore, we conduct a case study demonstrating the creation of health care service innovations in Kenya using design thinking methodology. Our findings prove that design thinking methodology is promising but still struggles to convince compared to conventional business paradigms.

1. Introduction

Developing countries face several challenges when it comes to service innovation. In the so called “bottom of the pyramid” markets (BOP markets; Prahalad, 2012, 6) insufficient infrastructure causes a series of problems (Berger; Nakata, 2013). People live scattered in the whole country. Scarce road systems make it difficult to reach people face to face (cf., 1200). Missing electricity and telecommunication infrastructure aggravates the introduction of information and communication technologies (ICT) crucial for many service innovations (e.g. Barrett; Davidson; Prabhu; Vargo,, 2015; Bygstad; Lanestedt, 2009; Miozzo; Soete, 2001). Future staff and future clients require a greater amount of training as a result of insufficient or missing means of acquiring, e.g. a television or a personal computer (Berger; Nakata, 2013, 1204). Furthermore, low levels of literacy and numeracy pose additional challenges for the roll out of service innovations (cf., 1200). Although not referring to service innovation in specific, Anderson and Markides (2007) put it precisely arguing that innovation in developing countries and their markets has its focus not on “finding customers than addressing issues of product affordability, acceptability, availability and awareness ” (88).

The inhibiting constraints for the innovation processes sketched before probably constitute the most urgent areas of innovation. In particular, infrastructure in terms of electricity and telecommunication is one big area where innovations can be seen as means of improving living conditions for many people. Berger and Nakata (2013) dealt with the subject of technology implementation for financial service innovation. They conducted a multiple case study analysis. Their findings indicate that, because of the specific conditions present, e.g. low income of potential customers and insufficient infrastructure, companies have to adapt their products and services, e.g. in

terms of pricing and paying infrastructure. These results also correspond with the findings of Anderson and Markides (2007, 83-84) that analysed several examples and demonstrated the need for companies to adapt to the exceptional conditions in BOP markets. Education and, although not mentioned before, health and social services also belong to the areas where innovation leads to improvement of people's welfare. At the same time these services rely on infrastructure and are more efficient when ICT is used. As in the case reported by Berger and Nakata (2013) technology implementation is only the first step. If people did not get into touch with technologies such as ICT before, issues in relation to literacy, culture, and technology acceptance have to be taken into consideration. Thus, fostering innovation activities in developing countries and BOP markets respectively demands an approach that is flexible enough to embrace the specific and manifold conditions that apply in developing countries.

In this paper we present the method of design thinking as an appropriate approach for this task. Design thinking is user-centred (Rhinow; Meinel, 2014, 245-246). It is an approach that divides out a problem before solving it. By this a problem is illuminated from different angles. This wide view is even intensified and complemented by including stakeholders in the design thinking process. If we consider, e.g., a service innovation settled in the field of telemedicine, there are several groups of people that "get in touch" with such an innovation. From all these groups of people a representative is included in the design thinking process and thereby bringing in important inputs. This might be particularly relevant stakeholders participating in the process are very different; especially in terms of their living environment. For instance, developing a telemedicine service for first world patients will not be suitable for patients in developing countries. Furthermore, the design thinking approach incorporates the conditions that apply to the innovation setting. We stressed before that these conditions in developing countries differ in comparison to the ones we experience in, e.g., in Europe.

The objective of this paper is to evaluate design thinking methodology as means of creating service innovations in developing countries. Thus the remainder of this paper is organized as follows: Section 2 describes the process of design thinking from a theoretical perspective. We then explain our research methodology in Section 3 and present a case study settled in the area of health services in Kenya in Section 4. The results of our case study analysis are presented in Section 5. Section 6 discusses lessons learned and draws on resulting research gaps. Our work is summarized in Section 7.

2. Learn how to innovate: the process of design thinking

Defining design thinking requires comprehension of the term design itself. Today "to design something" does not only mean to give something tangible a shape or "to make things" (Kimbell, 2011, 290) respectively. Instead, the term design has experienced a twofold upgrade in relation to its meaning: First, design is not only affiliated with tangible products but with services as well. Second, the notion that something that is designed resulted from a "sudden breakthrough (...) [or] the lightning strike of genius" (Brown, 2008, 4) is broken up and demystified. Instead, design is revealed as a process incorporating not the one and only design method but a compilation of

methods for problem analysis and problem solving (Simon, 1969 cited by Kimbell, 2011, 290-291). Although this broadened view on design might meet with what we intuitively perceive as design thinking, the concept as such was first discussed by Rowe (1987). Although Rowe is considered to have a slightly different understanding of design thinking methodology than businesses understand it today due to his work as a professor for architecture and urban planning (Liedtka, 2014, 2). Design thinking as means of “(...) [addressing] the needs of people who will consume a product or service and the infrastructure that enables it” (Brown; Wyatt, 2010, 29) was brought up by IDEO, a consulting firm focusing on the development of innovations. Design thinking methodology experienced a boost in development when IDEO started receiving more requests aimed at the development of service innovations. This triggered a shift in how design thinking methodology was used and perceived. Today, design thinking methodology is not only a means of designing new products and services. Instead it is a method to design new experiences for customers (Brown; Wyatt, 2010, 29).

In the following, we provide a “look and feel” of design thinking methodology and take a closer look at the process itself. Therefore, let us consider a cooking recipe and the correspondent cooking process. The recipe tells you what you need for preparing a meal: ingredients, know-how or experience, and cooking equipment. The cooking process as such is linear, except for some iteration concerning the addition of some seasoning. Though, linear components of the process remain dominant. Switching perspectives from cooking to business, we admit that there are linear processes in business as well, e.g., production processes, also containing phases of iteration, e.g., quality management. However, when it comes to activities in businesses that inhabit some kind of developmental activities the predominance of linearity vanishes. Instead, non-linear components, such as iterations, loops, etc. outweigh the linear components. Such a non-linear nature coincides with the perception of design thinking methodology in research. Brown and Wyatt (2010, 30; also Brown, 2008, 4) pictured the process “as a system of overlapping spaces”. This in line with Ingle, who characterizes the process as being of an “adaptable [and] flowing nature” and “with no direct line from Point A to Point B” (2013, 4-5). Cross (2011) carried out several case studies and uncovered one of the fundamentals of design thinking methodology: he recognized that people employing design thinking were continuously changing their perspectives from the problem side to the solution side and vice versa.

Despite the unique nature of design thinking processes, there are elements every design thinking process consists of (see Figure 1). Brown (2008) and his colleagues (Brown; Wyatt) speak of three elements: 1) inspiration, 2) ideation, and 3) implementation. Ingle (2013, 3-4) elaborates on these elements in more detail and divides the elements of inspiration and implementation into two sub-elements (“understand” and “define” and “prototype” and “test” respectively). Meinel and Leifer (2011, xiv Fig. 1) identify five common phases of design thinking.

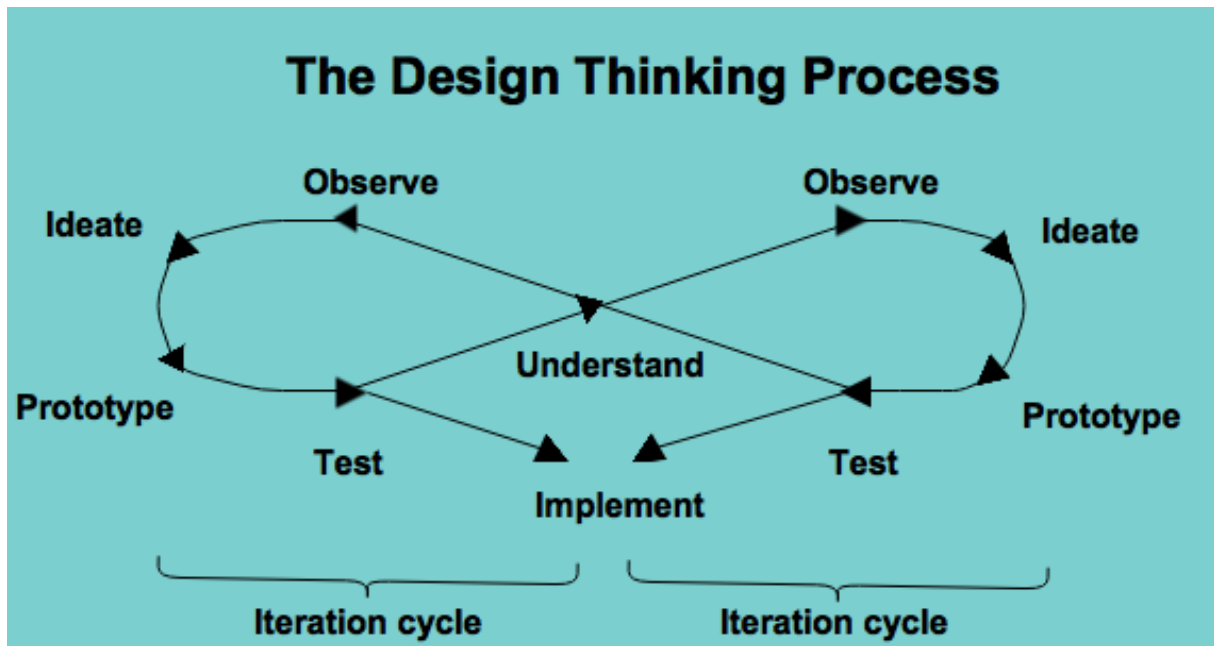


Figure 1: Elements of the design thinking process
Source: Data adopted from Ingle, 2013, 3-15; Meinel; Leifer, 2012, xiv Fig. 1

Every design thinking process starts with briefing providing the basic parameters of the project such as available resources and time frame (Brown; Wyatt, 2010, 30). The next step is to gain a deeper understanding of the problem at hand (Ingle, 2013, 5). Therefore, you have to determine who you address with a solution. This means not only to give the target group a name but to collect data about diverse parameters that draw a precise picture of the members of this group. This helps to get an idea of how the problem is perceived by the target group and its needs and desires (Brown, 2008, 2; Ingle, 2013, 6). Especially, when the solution is a service there are more stakeholders that have to be considered, e.g. people who deliver the service. They as well are affected by the problem at hand. Their perspective on the problem has to be explored too. If not a solution might be developed for the target group but fails to be delivered because the correspondent providers where not considered in the process. Exploring the stakeholder's different perceptions of a problem can result in the realization that different groups of people perceive the problem differently (Thienen; Meinel; Nicolai, 2014, 99). For the data collection diverse sources and methods can be used. In order to design an experience, the observation of the experiences of the stakeholders presents an appropriate starting point (Brown; Wyatt, 2010, 30). The better your data, the better your comprehension of the problem will be and the easier it will be to specify the problem in-depth (Ingle, 2013, 6).

Therefore, the before gathered data and the information about the problem from the different perspectives of the stakeholders have to be joined together. As a result a "stable problem view" is achieved (Thienen; Meinel; Nicolai, 2014, 99) which is required if possible solutions shall suit all stakeholder's needs. Furthermore, the consolidation of the different point of views enhances re-evaluation of the problem itself (cf., 101) and fosters a more detailed definition of the problem. Dedicating time and effort for the definition of the problem can reveal aspects that have not been considered before. They could have been the cause why the problem is still unsolved or former solutions did not work (cf., 100).

With the well-defined problem at hands, there begins the phase of ideation. Using creativity techniques, e.g. brainstorming, the participants of the design thinking process think up solutions for the problem (Ingle, 2013, 7). Every creativity technique has its peculiarities and demands specific things when coming to realization (Brown; Wyatt, 2010, 31). Apart from those specialties, Ingle (2013, 8-9) emphasizes rules to get the best out of ideation sessions. She states that before every ideation session its goals should already be communicated to the participants. By this, their minds already start to chew the problem over. Then, when the ideation session takes place participants already might have in mind solutions for the problem. Different stakeholders are involved in ideation sessions. Outside of the design thinking process these stakeholders differ in terms of background, education, position in the company or institution. It has to be made clear that during ideation sessions there is no hierarchy. Instead there is freedom to speak and the etiquette of listening when someone presents his or her ideas. Furthermore, a moderator is needed to ensure that the sessions keep focused on the defined problem and participants do not get stuck on a single issue. Besides, a moderator should actively engage in the time management and keep an eye on the group's energy and pause or finish sessions adequately. A proper documentation of the results is obligatory. Ingle (2013, 9) even suggests to document results redundantly.

The implementation phase contains prototyping and testing activities. Especially, when there resulted a bunch of ideas from the ideation phase, probably not every idea will be prototyped and tested. Therefore, the results of the ideation phase have to be sorted. To do so, researchers propose different approaches. Ingle (2013, 10) suggests evaluating the ideas from a business perspective and to differentiate them into different categories ranging from feasible and realistic to dreams of the future. Subsequently, feasible ideas should be re-evaluated in regard to the available resources and the extent of contribution to the solution of the problem (Ingle, 2013, 10). If there no ideas that fulfil the conditions of feasibility and affordability, and show a great promise in relation to the solution of the problem, you have to go back to the ideation phase and make up more ideas (Ingle, 2013, 11). Prototypes can be simple (Brown, 2008, 2) but at the same time should embrace what is essential for the solution (Ingle, 2013, 11). In other words, the prototype should serve you when tested (Brown, 2008, 2). Starting with the prototype of the ideas that needs least resources supports the starting of the prototyping process. By this, the motivation of the team is likely to keep stable and enhance a productive environment for this phase (Ingle, 2013, 11).

In the following test phase prototypes will be evaluated. Therefore, representatives of the different stakeholders that are using the solution or are affected by it should be recruited for testing (Ingle, 2013, 13). Documentation of the test results is essential and realized by different means, e.g., written reports, videos, audio recordings, images (cf.). Afterwards, the documented data is analysed. Common concerns, reactions, e.g., expressed by means of body language, or suggestions of the different stakeholders are aligned to clusters. Each cluster represents an important topic for the further development of the solution and has to be considered carefully (Ingle, 2013, 14). When each prototype was tested, an analysis and comparison of the test results reveals weaknesses as well as strengths of each prototype. Weaknesses and strengths have to be evaluated on basis of their importance for the solution. There may be major and minor weaknesses and major and minor strengths. Furthermore, it has to be considered that test results are a composition of the feedback of stakeholders that are affected by the solution in different degrees. This means a weakness

reported from a stakeholder affected in a high degree should be top priority (cf.). In the end, best alternatives are selected for further development. If none of the prototyped alternatives worked out well it should be investigated what went wrong. By this the team knows to which phase they have to go back and start again.

3. Methodology

A qualitative approach using a case study with a single-case design is employed to prove our research propositions. We decide for a single-case design because of several reasons. First and being most important, the data available did not allow for a multiple-case design. Furthermore and in line with Yin (2003), we argue that the single-case design is justified because of the representative and revelatory nature of the case (41-42). Although the application of design thinking methodology is not yet that common in business, it still has earned its position in the group of innovation methodologies (see Section 2). The idea of applying design thinking methodology to BOP markets is not new. In conclusion, we consider the case presented in Section 4 to be representative. Still, as the diffusion of design thinking methodology is not yet finished, conducting a case study which was carried out in a BOP market may uncover new knowledge about the application of design thinking methodology in such settings. Therefore, we regard the case as of being of a revelatory nature too. In the style of Eisenhardt (1989), we conduct our case study with the following steps.

Defining a research question. We want to prove our proposition that design thinking is a promising/sound method for the development of service innovations in developing countries. In doing so, we want to uncover the potential of design thinking methodology as a means to develop innovations customized to market conditions, customer and stakeholder needs. Thus, we define our first research question as follows:

RQ 1: "How is design thinking methodology contributing to the development of service innovations in developing countries?"

Design thinking is a demanding approach in terms of openness, patience, enduring motivation, and thoroughness required from the participants of the process (see Section 2). Additionally, every design thinking process is conducted in specific and unique circumstances. As a result, the course of events and the outcomes of the process are highly non-predictable. Hence, insights from a case study may provide lessons learned helping to improve design thinking processes in the future and derive implications for practitioners. Accordingly, our second research question is:

RQ 2: "Which are the lessons learned to improve future design thinking processes in developing countries?"

Case selection. This paper's objective is to demonstrate that design thinking methodology is an appropriate means for creating service innovations in developing countries. Therefore, we chose to present a case settled in the country of Kenya which is, according to the latest World Economics Situation and Prospects report (2015, 140) a developing country. The project described in our case study aimed at the development of a service that helps reducing child and maternal mortality in Kenya.

Data sources and data collection. Data was retrieved from different sources and in different forms. Above all, two of the authors of this paper were involved in the project

described by the case study. They were on-site and participated actively in the process taking the roles as a member of the Telekom team and a coach guiding and directing the process. They provided data by inputting their direct and participant observations. Moreover, they provided documentation in various forms such as presentations and photos. Data about Kenya and the issue of child and maternal mortality was retrieved from governmental sources of the country of Kenya and from the inter-governmental organization of the United Nations and its subsidiaries like the World Health Organization.

Case analysis. In order to analyse our case and find answers to our proposed research questions, we decided to adopt the approach employed by Berger and Nakata (2013). They conducted a case study dealing with the implementation of financial innovations based on ICTs. Using the Socio-Technical View, Berger and Nakata (2013, 1201) assessed which circumstances of ICT implementation facilitated or aggravated the implementation of financial innovations. In doing so, they depict which conditions and circumstances surrounding the innovation process have to be considered during the innovation process to achieve the highest possible fit between innovation and market. As a result, they defined eight research propositions grouped into socio-human conditions, governmental-regulatory conditions, and market conditions (cf., 1204-1208; see Table 1).

Socio-human conditions	
1) ICTs for financial service innovations in BOP markets are more effectively implemented when customer limitations such as low literacy, lack of identification, and technology unfamiliarity are addressed.	1) Health care service innovations in BOP markets developed by using design thinking methodology, exhibit a good market fit because customer limitations such as low literacy, lack of identification, and technology unfamiliarity are addressed.
2) ICTs for financial service innovations in BOP markets are more effectively implemented when support agent limitations such as technology and business development uncertainty are addressed.	2) Health care service innovations in BOP markets developed by using design thinking methodology exhibit a good market fit because support agent limitations such as technology and business development uncertainty are addressed.
3) ICTs for financial service innovations in BOP markets are more effectively implemented when staff accepts the technology and are trained to support its use by customers and agents.	3) Health care service innovations in BOP markets developed by using design thinking methodology, exhibit a good market fit because community health worker's technology acceptance and the need for training to support technology use by customers and agents is addressed.
4) ICTs for financial service innovations in BOP markets are more effectively implemented when staff monitor and adjust the technology after introduction.	4) Health care service innovations in BOP markets developed by using design thinking methodology, exhibit a good market fit because health care staff monitor and adjust service offers and technology after introduction.
Governmental-regulatory conditions	
5) ICTs for financial service innovations in BOP markets are more effectively implemented when the governmental-regulatory environment is understood, opportunities for technologies exploited, and government relations cultivated to support their use.	5) Health care service innovations in BOP markets developed by using design thinking methodology, exhibit a good market fit because the governmental-regulatory environment is understood, opportunities for technologies exploited, and government relations cultivated to support their use.
6) ICTs for financial service innovations in BOP markets are more effectively implemented when governments install, or allow banks to	6) Health care service innovations in BOP markets developed by using design thinking methodology, exhibit a good market fit because

install, sound EFT switches and provide facilitative regulations around usage.	governments install, or allow providers to install sound ICT-infrastructure and provide facilitative regulations around usage.
Market conditions	
7) ICTs for financial service innovations in BOP markets are more effectively implemented when market conditions such as an underdeveloped financial sector and low financial literacy are addressed through educational programs.	7) Health care service innovations in BOP markets developed by using design thinking methodology, exhibit a good market fit because market conditions such as an underdeveloped health care sector and low levels of health education and health literacy are addressed.
8) ICTs for financial service innovations in BOP markets are more effectively implemented when market conditions such as few capable business partners and evolving competition are anticipated and responded to.	8) Health care service innovations in BOP markets developed by using design thinking methodology, exhibit a good market fit because market conditions such as few capable business partners and evolving competition are anticipated and responded to.

Table 1: Research propositions by Berger and Nakata (2013) and derived evaluation criteria

Source: Data adopted from Berger and Nakata, 2013, 1204-1208

Originally, the Socio-Technical View was used to assess the fit of technology to technology users, technology purpose, and setting of technology use (Berger; Nakata, 2013, 1201). This pattern of thought matches the user-centered paradigm embraced by design thinking methodology. Therefore, we want to join the Socio-Technical View with design thinking using the research propositions set up by Berger and Nakata and transform them into criteria to evaluate the fit of design thinking to the setting of developing countries.

The research propositions created by Berger and Nakata have to be adapted to the present case study. First, our case study deals with child and maternal mortality rates and possible service solutions aiming at the reduction of these rates. As a result, we altered this key aspect in the research propositions from ICT and financial service innovations to health care service innovations. This included integrating stakeholders involved in health care, e.g., community health workers. Second, there is one solution in our case study where ICT plays only a minor role. Consequently, we put into focus not the technology needed to realize a solution but the solution itself. Finally, we do not want to limit our analysis to the outcome of the innovation process. As our aim is to evaluate design thinking methodology when applied for the development of service innovations in developing countries, the method has to be included in the research propositions. The adjusted research propositions constitute the basis for our case study analysis and the evaluation framework we need to prove our research questions.

4. Learn how to innovate: design thinking in Kenya

The case is settled in Kenya, Africa. Kenya is one of the Sub-Saharan African countries where child and maternal mortality rates are still high. Reduction of child and maternal mortality rates are one of the Millennium Goals of the United Nations Development Program to be reached in 2015 (Millennium Development Goals (MDG) Acceleration Framework, 2014, 19-20). Therefore, Kenyan Government brought several activities underway to reach these goals, e.g. medical service bundles including, above others, immunization for pregnant women and children under five (Ministry of

Devolution and Planning Kenya (MDPK), 2014, 17). Results of these activities are mixed but encouraging. Since 1990 the infant mortality rate reduced from 60 out of 1,000 to 52 out of 1,000 children in 2011 and aimed to be down by 22 in 2015 (MDPK, 2014, 17). Under five-mortality rate dropped from 91 out of 1,000 in 1990 to 74 out of 1,000 children in 2011 and is desired to diminish to 32 (MDPK, 2014, 17). The maternal mortality ratio decreased from 590 out of 100,000 in 1990 to 488 out of 100,000 mothers in 2009. This ratio is not satisfactory. The aim for 2015 is to reduce this ratio to 147 out of 100,000 mothers (MDPK, 2014, 18-19). The outlined situation in Kenya is a result of several conditions that are symptomatic for developing countries (see Section 1). To provide comprehensive maternal and child care there is not enough personnel. Furthermore, the personnel lack proper training to assist women in prenatal and postnatal stages. People have poor access to health facilities or lack the financial resources to do so. In fact, insufficient financial resources contribute to poor health of mother and child. This is especially severe when financial resources are too little to satisfy nutritious requirements. Sometimes mothers-to-be simply do not know which medical treatments they need in preparation for the birth of their child and are unaware of its benefits. Even if there is awareness of the use of pre- and postnatal care families are unwilling to embrace it (MDPK, 2014, 17, 20).

Seeking an opportunity to enter the African market, the German telecommunications and ICT provider Deutsche Telekom AG took the two Millennium Goals as a starting point to set up an initiative, the Telekom Challenge, aiming at the development of a solution that tackle the problems of child and maternal mortality in Kenya.

As a first step and required for the design thinking process is an appropriate team. Via means of the before mentioned initiative, Deutsche Telekom AG called on to every employee within worldwide Telekom companies to apply for this project. In the end, ten employees were selected and assembled a team. Additionally, there were two coaches from Launchlabs, a consultant agency who specializes in intrapreneurship and innovation processes (Launchlabs, 2015) and four people from the Group Transformational Change. The employees from Deutsche Telekom AG came from Monte Negro, Serbia, Hungary, and Germany. Apart from their cultural diversity, team members owned different professional skills such as engineering, strategic management, marketing, and software programming. Although combining different cultural backgrounds, working cultures, and competencies, at this point of the process no other stakeholders were involved.

For the whole project two times two weeks were scheduled on-site in Kenya. In the following, we want to provide insights from the different phases of the design thinking process presenting the course of events, goals and results of each phase.

Understand. First, the team had to gain a deeper understanding of the question "Which solutions can be developed by Deutsche Telekom to reduce child and maternal mortality in Kenya?". Therefore, team members and coaches were briefed and provided with information material by Deutsche Telekom in advance of their stay in Kenya. Second, the team had to gain the same understanding of this question. Using the method of reframing, a method fostering people to view an issue from different perspectives and catalyse new stimuli for developing problem solutions (Kolko, 2010, 22), the original question was split up resulting in five new questions (Deutsche Telekom AG, 2013, 12):

- How to decrease the mortality rate of pregnant women?
- How to improve the education of pregnant women?
- How to improve the awareness about the health situation?

- How to increase the income of CHWs?
- How to achieve consistent patient data to improve treatment and drive women's behaviour?

Observe. The five questions that resulted from the former phase were used as a basis for the observe-phase. In order to achieve a 360-degree-perspective on the topic of child and maternal mortality in Kenya, the team split up into smaller groups and conducted research on-site. Data was collected through talks with NGOs and other health care stakeholders such as mothers and mothers-to-be, entrepreneurs of the health care market, or hospital representatives. These talks included visiting the environment of stakeholders, e.g., homes and hospitals. Thereby, the team learned about living and working conditions of mothers and mothers-to-be as well as people in the maternal health care-process chain.

Define. In order to consolidate the gained information from the former phase and connect it with the original problem, teams were split up again. Then, two fractions separately reworked the questions from the understand-phase. Rephrasing via means of cloze texts helped rendering the questions more precisely. This in turn, enabled the team to uncover the problems implied by the questions and direct subsequent efforts for developing a solution more focused. An example of these activities can be seen in Figure 2.

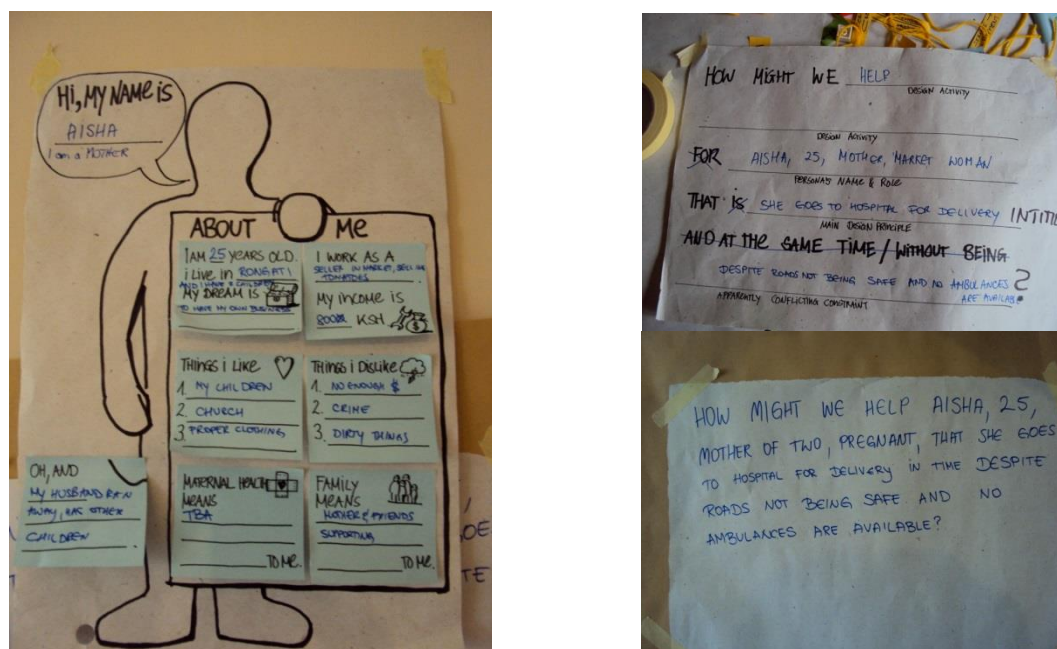
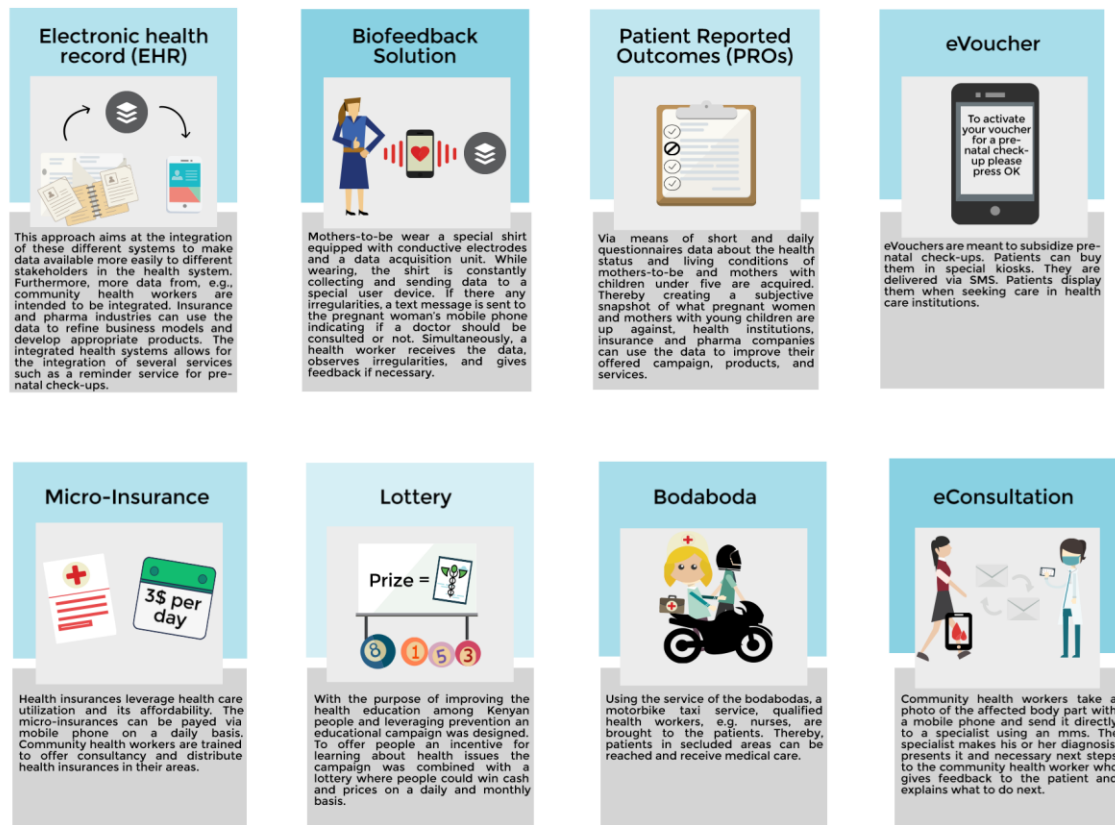


Figure 2: Reframing using templates
Source: Launchlabs, 2013

Ideate. In a matter of hours and deploying different modes of brainstorming, a creativity technique to make up ideas, eight ideas were developed. Subsequently, the team was split up again into groups of two that worked separately on the further development of the ideas. By this, all eight ideas experienced further consideration and the variety of the made up solution could be secured. It has to be mentioned, that not

all of these eight ideas were developed exclusively by the team. Instead, there were influences from the outside that brought in a single artefact or process idea that now could benefit from the design thinking methodology as such and be advanced. A brief description of the eight ideas is presented in Figure 3 (Deutsche Telekom AG, 2013, 13).

Solutions



powered by
Piktochart
make information beautiful

Figure 3: Solutions resulting from the ideate-phase
Source: Deutsche Telekom AG, 2013, 13

Prototype. Every idea was prototyped using posters, post-its, Lego bricks, and other cheap and easy to use materials. Such a prototype demonstrating the fundamental functionality of the micro-insurance is presented in Figure 4.

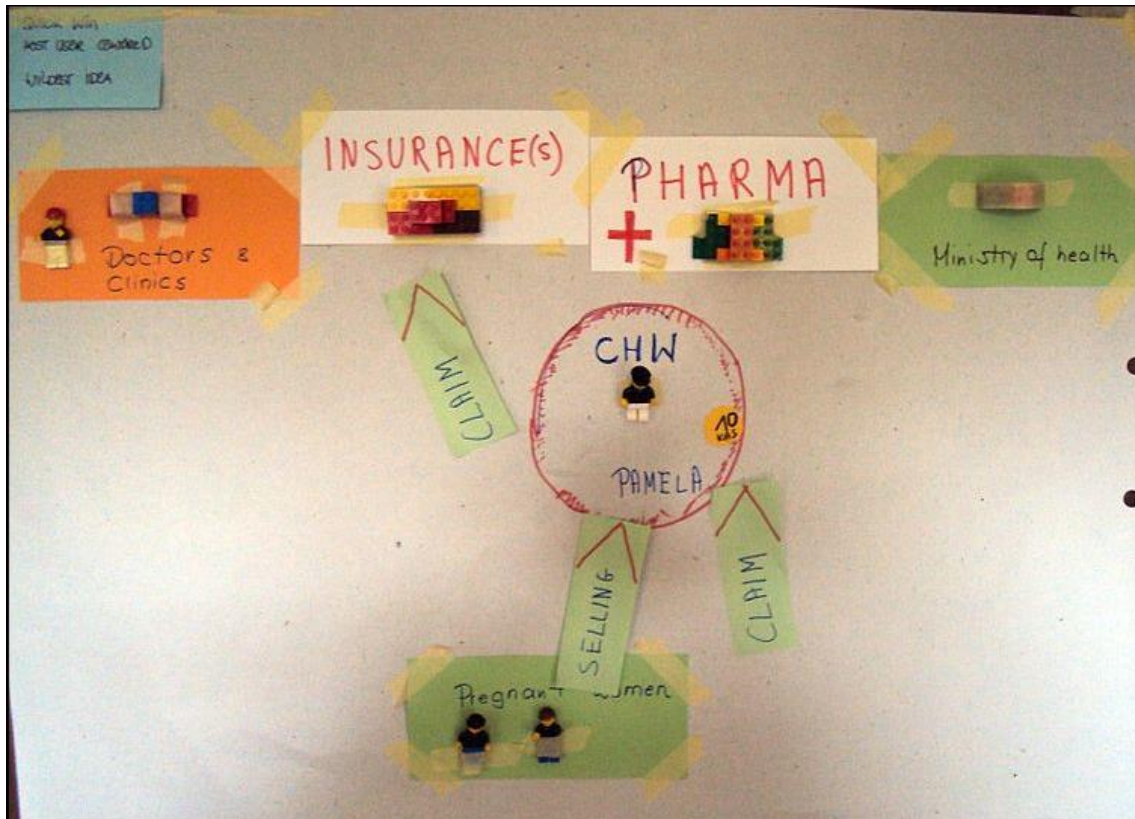


Figure 4: Micro-insurance prototype
Source: Launchlabs, 2013

Test. After setup of the first generation of prototypes, stakeholders were invited. During co-creating sessions the prototypes were presented and discussed together with stakeholders. In order to refine the solutions the next generation of prototypes was setup together with stakeholders.

Most of the time was spent on the observe-phase. Other phases were passed in a matter of hours. In sum, there were four iterations. Thereby, the solutions eVoucher, lottery, and micro-insurance were not further developed. The electronic health record was the solution favoured by Deutsche Telekom. In the end, none of the solutions was further developed by Deutsche Telekom.

5. Results

In Section 3, we defined eight criteria for evaluating design thinking methodology as promising for the development of service innovations in developing countries. Now we will prove if these criteria are satisfied. Thus, we will discuss the criteria in groups beginning with the criteria displaying the socio-human conditions.

During the observe-phase the team retrieved exhaustive information about the different health care stakeholders in Kenya. Being on-site, the team collected data during several days up to a week. A combination of action research and desk research was

employed to gain a 360-degree-perspective on the topic of child and maternal mortality.

Problems/ Issues: Apart the means of information retrieval mentioned in Section 4, the team also wished to experience face to face against what young mothers and mothers-to-be are up to. To ensure the safety of their people, Telekom provided an obligatory safety-training and set up strict safety regulations which forbid this kind of experience and limited mobility in Kenya. Without the intention to dismiss these safety concerns, one could argue that these limits cause bias in information aggregation and aggravate or, in worst case, prohibit getting a 360-degree-perspective on the problem.

Being from a big and known German telecommunications company smoothed the way for personal interviews with stakeholders. At the same time it created expectations that could not be met. For instance, entrepreneurs waited for financial sponsorships to advance their ideas. However, innovative product or service solutions at the end of their development phase were denied to enter the design thinking process because of the danger that they were developed not as a response to concrete demands and therefore not being user-centred. Furthermore, acting as representatives of such a known company created uncertainty within the team. There were discussions about interview strategies as well as the dress-code (jeans vs. suit).

Governmental institutions form another group of stakeholders. They are also included in the research activities conducted during the observe-phase. In our case study they brought in the lottery and eVouchers to foster further development of these ideas. During co-creating sessions governmental representatives gave feedback to prototyped ideas. By this, valuable information supplemented the data from the observe-phase and the transfer of tacit knowledge was stimulated.

Problem/ Issues: Again, representing a well-known company caused uncertainty for the team. As demonstrated in Figure 4, prototypes were made with post-its and LEGO. Presenting these childish appearing prototypes caused discussions between team and coaches. Telekom employees who probably stood one's ground several times during their professional life were insecure if they will be taken serious when showcasing the prototypes to governmental representatives. Coaches were asked to smooth discussions in order to keep motivation up for ongoing iterations.

Before being on-site, the Telekom team as well as the design thinking coaches received a reader provided by Deutsche Telekom. The reader contained information about the country of Kenya, the Kenyan health care system, data about child and maternal health issues, and information about the Kenyan telecommunications and health care market. Naturally, the information was selected and brought together to sketch business opportunities for Deutsche Telekom. This means, before the design thinking process started the team learned about the innovation setting and the market conditions. This information was complemented with the research conducted during the observe-phase.

Problem/ Issues: Contrary to the expectations of the whole team regarding business development, innovation activities, and telecommunications infrastructure, Kenya surprised by possessing a vivid start-up scene with people eager to create new solutions. In terms of telecommunication Kenya demonstrated having better network coverage than Germany. Furthermore, owning a mobile phone is self-evident.

General problems/ issues: The observe-phase aims at perceiving a 360-degree-perspective on a problem. An important issue in this phase of the design thinking process is to draw a final stroke. One possible way to do this is introducing time frames. Still, deciding for an adequate time frame needs gut instinct and experienced coaches.

Some team members showed difficulties leaving their usual work sphere and breaking loose from their perceived roles in their home companies. As demonstrated before, this resulted in doubts and discussions about the way things are done using design thinking methodology. Especially, when stakeholders are involved that represent important potential business partners, design thinking methodology was questioned.

6. Lessons Learned, Research Gaps, Limitations

Although the design thinking process resulted in promising ideas for reducing child and maternal mortality in Kenya, none of the solutions was realized and implemented. Deutsche Telekom abandoned the idea of entering the Kenyan market after the project. The authors are not aware of when or if Deutsche Telekom reconsiders this decision at present. Apart from strategic concerns this act of retreat reveals that design thinking does not end when prototypes are tested and adjudged to be ready for market launch. Instead, design thinking has to be integrated into everyday corporate culture so that the before mentioned role conflicts can be avoided. This does not necessarily mean that future employees change their keyboards for post-its but it encourages thinking beyond traditional structures such as business units.

There is need for actions when it comes to avoid conflicts originating in the way things are done with design thinking. Leaders of a project teams and design thinking coaches have to prepare people thoroughly to leave these doubts aside. This could be achieved by an introduction to the design thinking methodology. In doing so, people have more time to break loose from their conventional everyday business practices. Furthermore, instead of being thrown in at the deep end, learning about a method may be the best way for team members to eliminate doubts. Simply put, measures of converging the project team's expectations of the look and feel of design thinking methodology to the actual design thinking experience present a research gaps. Furthermore, we propose that the issue of documentation shall be an area of future research. Given the fact, that many design thinking case studies in literature focus on the problem solutions developed by design thinking methodology rather on the design thinking process itself, details about the process of design thinking are valuable.

7. Conclusion

In our article we responded to a research implication brought up by Berger and Nakata (2013, 1209-1210). They proposed exploring further the conditions that characterize BOP markets and find ways to respond to these conditions. Design thinking methodology is one way of response. It includes the conditions sketched in the di-

mensions of the Socio-Technical View before thinking up innovations. This means the information gathered throughout a design thinking process stimulate creating raw patterns that support seeing things from a different perspective and by this, seeing things from the eye of stakeholders.

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D3: Services, regional and local development

Chair: William Beyers

Dynamics of Trade in Services: Exports, Imports and Local Demand in Washington State and the U.S.: 1963-2007

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This paper documents changes in export shares (to the rest of the U.S. and on foreign trade account), import shares (from the rest of the U.S. and on foreign trade account), and Washington state production shares over the 1963-2007 time period for service industries. The paper utilizes the unique history of Washington state i/o models (eight survey-based models spanning the 1963 – 2007 time periods) along with data from the benchmark U.S. i/o models to develop the metrics described above. While there is a significant literature on export trade in services, including producer services, this literature has tended to be cross-sectional rather than longitudinal, and it has not focused on local and external sales relationships simultaneously. There has been much less focus given to the issue of services imports. The data base to be utilized in this paper allows a simultaneous focus on purchases (local plus imports) and sales (local plus exports).

1. Introduction

This paper begins with a discussion of early concepts regarding trade services. The characteristics of this trade are then reviewed from multiple perspectives, including the role of trade in services revealed using various statistical sources and a review of surveys of trade in services. The paper then turns to selected data from input-output models that document the growing importance of the demand for and trade in services.

Greenfield (1966) pioneered a vision for what we now accept as producer services—activities whose primary clients are businesses and governments, as opposed to households. The classic view of services as being perishable, being consumed in the moment of their supply, was challenged in Greenfield’s work, opening up the notion that services could be consumed (traded) other than at the time of their production. Greenfield conceptualized “semi-durable” and “durable” services, extending concepts introduced by Kuznets as a part of his pioneering work on national accounts. Since Greenfield’s work the modes by which the outputs of services can be traded are very different. Information and communications technologies were much less developed 50 years ago; the advent of networked computers to store information combined with telecommunications technologies now allow interactions in modes not even imagined in 1966. Entire categories of service industries that are accepted as routine today--such as provision of cloud computing services or investment services guided by modern portfolio theory--did not exist when Greenfield conducted his research. Text, data, and graphic files were certainly created at that time, but their storage and transmission (over media such as the internet) has subsequently helped to facilitate the growth and development of

services trade. We can anticipate future changes in producer services supply and demand in ways that are unpredictable at the time of this writing.

Trade is defined as a sale between a buyer and a seller, and from a geographical perspective we can classify where this trade takes place. The simplest dichotomy is between trade that takes place between clients and suppliers locally or in close geographic proximity, and nonlocal trade that takes place over some greater distance. Such interregional trade, however defined, can be defined in a local-nonlocal dichotomy, or within a multiregional framework with many regions of supply and demand.

Unlike trade in goods, which has been tracked through customs and international trade regulations, and reported in great detail (such as through the World Institute for Strategic Economic Research), trade in services has not been the subject of government statistical programs in most countries. Output or sales of services has been measured through series such as the Economic Census in the United States, but the geography of these sales is undocumented. National programs for the measurement of trade between industries are reported in input-output models, but these are typically one-region as opposed to interregional models, and are rarely explicitly international models. Data on the geography of trade in services have come from two broad sources: ad-hoc surveys, and regional input-output models that have an export measure of sales. One of the highest priority topics for the expansion of official statistics from national and international government agencies is the development of robust statistics on trade in services. Given the dominance of services employment and output in the global economy, this is a major oversight in measurement programs that needs to be remedied. The reasons include the need for basic documentation of the structure of regional and national economies, and the role or value that this type of data has for economic development programs.

It is useful to look back on how the notion of trade in services was treated in early literature on the regional economic base. The classic economic base model divides economies into two markets: export and local. Before direct measures of regional trade were undertaken, authors classified industries as exogenous or localized, but struggled with this dichotomy recognizing that some industries were “mixed.” A paper by Polzin is an example of how services trade was treated in this early literature: “Trade and service activities constitute the bulk of the mixed industries and the planner/analyst has little to lose by ignoring them in the construction of the exogenous sector” (Polzin 1973, 231). The statistical basis for this statement is not explained and it was not until surveys of the markets of service industries were conducted in the mid-1980’s that it became evident that this conclusion was erroneous.

Pioneering spatial models of service industries—such as central place theory—were built around services trade, but trade of a localized nature. The hierarchical structure of these models were linked to variations in the spatial thresholds for successful entry of sellers of particular services, services largely consumed by households. The growing size of markets for services not primarily destined for household consumption—sparked changing perspectives on trade in services. This paper turns to a review of these developments in measures of trade in services, with an emphasis on research focused on trade in producer services.

2. The unfolding of perspectives on services trade

In a discussion of types of services, Daniels noted that geographic markets are likely to be very different across them. Discussing markets for a greengrocer versus a consultant providing advice on the purchase of telecommunications facilities he wrote: "It is conceivable...that the specialist consultant has a market which extends throughout a country, either because no other organization is able to provide the service or because there is insufficient demand to justify the existence of more than one such firm (Daniels, 1982, 31)." Daniels wrestled with location principles guiding the greengrocer, and the producer services firm, noting that central-place model location principles were less likely to apply to location choices of producer service specialists. Without mentioning the geography of trade explicitly, Daniels implied the potential for trade, especially in the face of the development of information technologies.

In 1985 Daniels extended the argument just made, with some of the first estimates of the magnitude of trade in services: "During the last decade trade in services has become one of the most rapidly growing and changing sections of international trade. It has been estimated that services now account for one third of world trade amounting to a massive \$550,000 million in 1980. About 20 per cent of the world total is accounted for by the USA, with France and Britain in second and third place respectively (9.4 percent and 9.2 per cent of world trade in invisibles). Until recently most of the services crossing international boundaries were ancillary to, or in support of, the trade of goods (such as the financial services which permit trade in goods, transportation or consulting services). Now services are traded in their own right: advertising, market research and management consulting, telecommunications services, computer services, specialized financial services in banking and insurance and business services. The spread of multinational enterprises has encouraged the growth of international trade in services, even though some of the transactions will be between the constituent parts of the same enterprise. Unfortunately there is a shortage of reliable statistics on international trade in services; it remains difficult to measure and analyze trade volumes, patterns and composition." (Daniels 1985, 35-36).

Ochel and Wegner focused on trade in services in Europe and explored the transformation of markets in the context of the 'new economy': "The internationalization of markets is facilitated by the growing tradability of services. Advances in communications technology and in information storage and processing have made it possible to produce services in one place and to consume them somewhere else and to produce services at one point in time and to consume them at a later date. Any service product that can be reduced to electronically coded pieces of information can theoretically be delivered to any point in the world with great reliability, at relatively little cost, and with no time-lag. Of course, there are many difficulties in implementing such an information system." (Ochel and Wegner 1987, 62). Their argument seems to ignore types of services where face-to-face communications is important in delivering the service.

Improvements in technology were also important such that: "Trade in producer services is also growing because the cost of 'transporting' services is falling over time. The long-term rise of trade in goods is in part due to innovations in transportation technology:

navigation; shipbuilding; railways; trucking; etc. Improvements in communications technology (telephone, fax, television, courier services, etc.) have had a similar impact on trade in services. To this must be added improvements in the transportation of persons, lowering travel costs for “labor embodied” services. From this follows increasing interregional specialization with respect to services, bringing into play questions of comparative advantage, where services come to play an increasingly critical role in the definition of the economic base of regions.” (Bailly et al. 1992, 25). This was later confirmed in a survey of producer service firms that identified increased use of digital modes of delivering services, but no reduction in the need for face-to-face meetings with clients. Bailly et al. also examined the channels of interregional trade in services, distinguishing between direct service trade, intra-firm trade in services, intra-firm service trade by primary sector and manufacturing firms, trade in services as a result of trade in goods, links with factor flows, labor-embodied services, and service flows versus factor flows. They argued that intra-firm flows are important and can be tracked using survey methods and that survey data on inter-firm trade in services underestimates total trade flows.

Daniels returned to the issue of trade in producer services, observing that: “In order for services to become prominent actors in the world economy they must possess attributes that enable them to be exchanged across geographic space (Daniels 1993, 25).” He noted that some services are not tradable, and presented a taxonomy for service firm internationalization with regard to service multinational enterprises, international trade and foreign direct investment in services, the global system of cities, and the internationalization of services and the restructuring of cities. He also speculated about the desirability of service-dominated economies, the inevitability of the globalization of services, the unfulfilled potential of telecommunications, and whether IT advances will impact interaction: “Innovations in the applications of information and telecommunications technology are therefore set to continue. They are worth noting because their ultimate effect, threatened for years but yet to be manifested, may be to replace a global service economy dependent upon intensive transactional flows (people, information, electronic messages etc.) between a small number of large, highly centralized control-points with a more dispersed telecommunications-dependent network of transactions. Flows of human capital will be far less significant though still necessary for the conduct of high-level negotiations and information exchange.” (Daniels 1993, 175-176). He went on to speculate about the role of telework, and the possibility of business cycles in advanced services.

Another evaluation of the means of exporting services was offered by Rief et al.: “There are different ways of selling services across borders. Direct selling is by no means the primary method for residents of one country to provide services to residents of another.”... “*International Consulting*. International consulting, also termed transient service exports, occurs when a US businessperson renders a service to a foreign client on a short-term basis.”... “*Direct Exporting*” Because the value of some services is embedded in the tangible products associated with these services, the export of a service sometimes can be shipped much like a manufactured good. Examples of this type of service export include books, pharmaceuticals and software.” ... “*Telematic Trading*. Telematic trade is another means of exporting a service and one which involves the transfer of knowledge and information abroad via telecommunications.” ... “*Royalties and Licensing Agreements*. According to the Bureau of Economic Analysis, royalties and licensing fees consist of receipts and payments for the use of patented techniques, processes, formulas, and other intangible property rights used in

goods production, as well as copyrights, trademarks, franchises, rights to broadcast live events, and other intangible rights.”... “*Franchising*. A franchise is a business arrangement in which an established business gives an independent party (the franchisee) the rights to use its brand names or trademarks, and transfers knowledge which is essential to running the business.” “*Providing services to foreign visitors*. This export can be simply defined as a service performed and completed in the United States and sold directly to a foreigner which in the United States (Rief et.al., 1997, 5).”

A recent assessment by the EU of the delivery of business services speaks to some of the issues surrounding the expansion of trade in services, including producer services. Four pathways to internationalization are identified and these could also be interpreted as pathways for interregional trade in a huge internal market such as within the United States. These pathways are:

Mode 1: *cross-border supply*, which occurs when suppliers of services in one country supply services to consumers in another country without either supplier or consumer moving into the territory of the other.

Mode 2: *consumption abroad*, which refers to the process by which a consumer resident in one country moves to another country to obtain a service.

Mode 3: *commercial presence* occurs when enterprises in an economy supply services internationally through the activities of foreign affiliates.

Mode 4: presence of natural persons describes the process by which an individual moves to the consumer’s country to provide a service, whether on his or her own behalf or on behalf of his or her employer.” (European Commission, 2014).

There are no data included in this EU report to illustrate the relative importance of these pathways.

3. Broader Arguments Regarding Trade in Services

The emphasis in the preceding section of this entry has been on the growing role of interregional trade in services, but it is important to recognize that local demands for producer and other services remain important. This can be measured using a two region model inspired by interregional input-output models of trade in all economic activities, with explicit producer service trade modules linked to intraregional and interregional demand (Beyers 1990). Figure 1 illustrates this two region system; in each region there is a block of local final demand (personal consumption expenditures, investment, and government), and a block of local income which is linked to the local production system (producer services, and the transformative, distributive, retail, not-for-profit and mainly consumer services sectors). Exports and imports are shown for all sectors in this fully enclosed system and it was argued that, on the basis of

these connections, if demands rose or fell in one region this would lead to inter-regional consequences across all elements of the multiregional system.

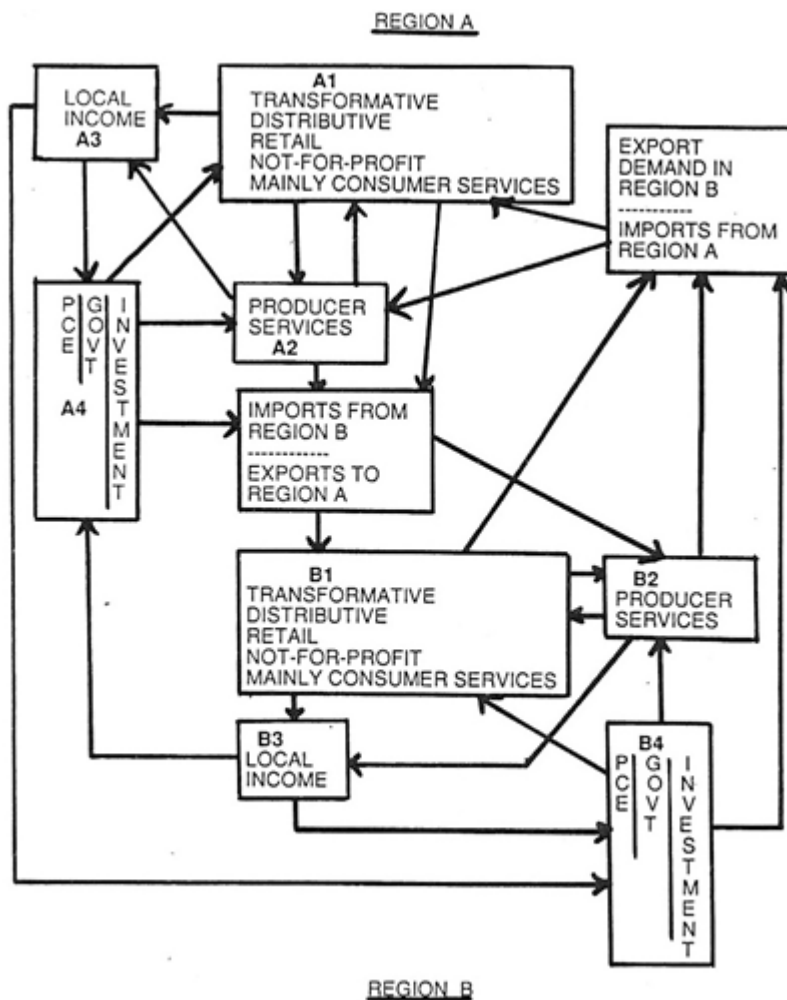


Figure 1 A two-region system of trade

Using data for Bureau of Economic Analysis (BEA) economic areas in the United States, Beyers used the system illustrated in Fig. 1 to estimate producer services trade using location quotients. He concluded that: "The growth of producer services employment in a given region should be seen to be a function of the growth of producer services exports and exports of other key industrial sectors. These changing export demands in turn lead to local direct requirements for producer services and other inputs, and they directly create local income. These direct requirements lead to a chain of indirect effects, which have associated with them additional demands for producer services and other sectors, that also create additional income. Expenditures of locally created income leads through the consumption and government expenditure process to additional indirect and induced effects, including local final demands for producer services." .. "In regions with a strongly expanding export base, this set of linkages appears to have led to strong growth in producer services, and the opposite has been the case in regions with a declining or slowing growing export base." ... "Over time, the importance of these interregional connectivities may be increasing in the producer services as businesses are able to extend market areas through the use of advanced information processing and telecommunications technologies" (Beyers 1990, 167).

Returning to trade in services in 2007, Daniels reminded us of the traditional argument for service production and consumption to be co-located because of the ‘non-tradable’ nature of many services. However, he argued that this restricted view has been modified by the advent of information and communications technologies (ICT), including the associated increases in service sector productivity. These forces have led to services globalization with four dimensions: flows, networks, frameworks, and brands and trademarks. Daniels offers a portrait of trade in these dimensions benchmarked against the year 2000; the system of flows is similar to Figure 1, but reports estimates of inter- and intra-regional flow (Daniels 2007). This rich diagram documents strong intra-region and export trade in Europe, the Americas, and Asia & Oceania. Implicitly, imports are captured in the system of trade flows documented in Figure 2.

The size of the boxes in this diagram are proportional to total exports across the four regions, divided into intraregional and interregional trade. The high intra-regional percentages for Europe reflect the large number of relatively small countries with large European markets. The export shares for each regional block add to 100%.

Daniels mentions a number of indicators of these dimensions associated with this pattern of trade, such as the availability of infrastructure and institutions allowing the four modes of supply identified above to operate for trade and foreign direct investment (FDI) (for example, growth in services share of FDI and structural change within OECD countries in the composition of services FDI, especially the strong growth in the share of business services and transportation & communication services, and decreases in the share of trade, financial intermediation, and other services (subject to strong cyclicity)). Another indicator is a new international division of labor allowing integration of production systems across national boundaries (such as the offshoring of telephone based support systems to places such as India by US or European service firms), particularly by multinational corporations (MNC’s) that threatens services job creation in the US or Europe.

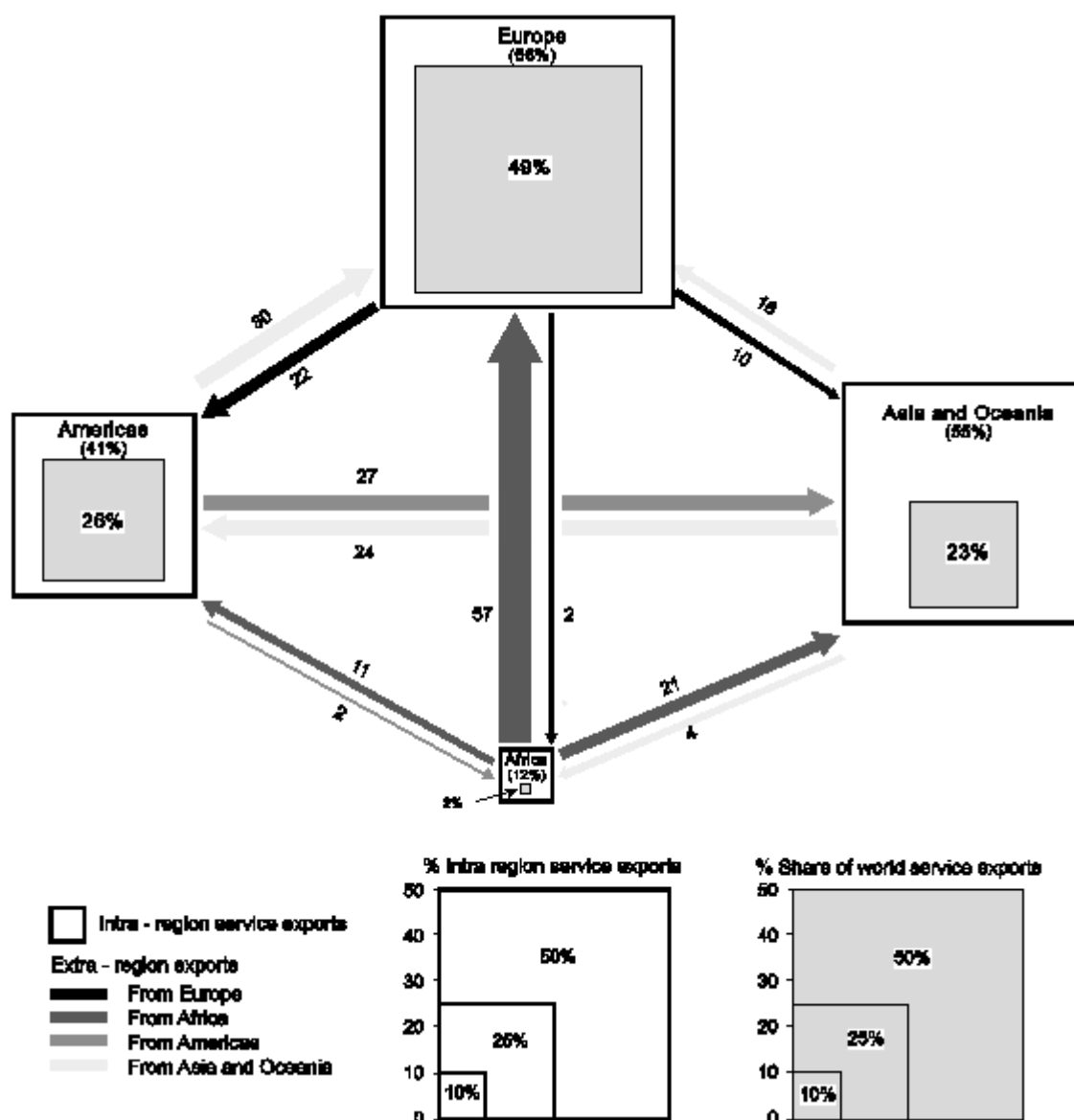


Figure 2 Daniels model of global trade in services

4. Producer Services trade – survey research

Beginning in the 1980's there was a burst of survey research on the markets of producer service businesses. It is fair to say that this stream of research was stimulated by the lack of industry detail in official statistics and in regional input-output models that presented data for producer services in a highly aggregate manner, as well as by the recognition of the rapid growth of producer services employment and output. It is worth noting that there has not been a comparable body of research undertaken since the turn of the century, so it is not clear whether and how the conclusions of this earlier research may be altered by current data that show continuing increases in the magnitude of trade in producer services.

Beyers and Alvine reported on a large scale survey of the markets of 2,200 producer service establishments in the Puget Sound region of Washington State that found half of them had sales of at least ten percent outside the local area (Beyers and Alvine 1985). Of the establishments that met this criterion the average percentage of external sales was 55%, with the overall level of export markets about 35% when merged with the localized establishments. There was no correlation between firm size and export market percentage although a large cohort of establishments that had experienced growth in their export percentage also expected an expansion of export share in the near future. Major variations in export propensities were reported by industry, with accounting having a low export market percentage while other industries such as research & development reported a very strong export market percentage.

The channels of trade in producer services, including (1) direct service exports, (2) intrafirm service exports by producer services firms, and (3) intrafirm service exports by manufacturing firms were surveyed by Coffey and Polèse. They reported that: "With the language may have acted as a barrier to exports, as well as transport costs, professional licensing requirements, and work permits. They argued that given these barriers, producer-service firms would be tempted to establish local offices to penetrate outside markets. (Coffey and Polèse 1987, 600-601).

A survey of Vancouver BC producer service firms measured their markets by sector served (primarily sales to other service industries), as well as their geographic reach (Ley and Hutton, 1987). The study found 51.4% of firms had greater than 75% of their sales in the Vancouver area, 20.4% had at least 25% of sales elsewhere in British Columbia, 20.9% had at least 10% sales elsewhere in Canada, and 13.3% had sales of at least 10% elsewhere in the world (percentages do not add to 100% because of the way in which this survey was phrased). The respondents also thought that Vancouver would be a major source of growth (68%), along with the rest of British Columbia (20%). This contrasts with later research that showed a sample of firms anticipating much more growth in markets outside Vancouver (Davis and Hutton, 1991). That paper also explored the idea that producer services were becoming increasingly tradable. This draws from Davis's work on an input-output model of the Vancouver regional economy from the mid-1980's that showed strong exports of business services from the Vancouver area (44.7% local markets, 44.2% to other B.C., 7.2% to other Canada, 1.5% to the U.S and 2.4% to the rest of the world). A related study in 1990 reported higher levels of exports from the Vancouver region for engineering, management consulting and computer services businesses, while advertising was estimated to have strong local markets. This survey also asked firms about expected changes in markets, finding that they expected a larger share of exports: exactly what the Beyers and Alvine study reported in 1985.

Further corroboration was provided by surveys of the export markets of producer service firms in Edmonton, Alberta which showed an average of 36% in service exports - very similar to Beyers and Alvine's documentation of trade in producer services in the Puget Sound region (Michalak and Fairbairn, 1988). Michalak and Fairbairn concluded, first, that a peripheral city such as Edmonton did not have strong producer services links to the Canadian economic core (Toronto/Montreal), implying a weak role for the core-periphery model in explaining markets for producer services. Second, their data suggested that the Alberta region was developing independently of the Canadian economic core. Third, they found that services exports were to places unrelated to their size. Fourth, they found markets links with

services and government and, finally, that a successful regional economy depended upon an adequate supply of producer services as inputs to the production process in ways that made their clients/users competitive.

A study centered on Chicago by Esparza and Kremnec found that manufacturing was not the dominant market of producer services except for advertising firms. The linkages of the firms were mapped, revealing a two-tier system. The first tier involved interaction among world class cities, and argued that gateway cities dominated interaction in the contemporary global urban system. The second tier was found to be within the U.S. system of cities, resembling a hierarchical structure, with distance mitigating interaction over long distances (Esparza and Kremnec 1994, 44).

In the late-1990s it was recognized that trade in producer services would likely be influenced by considerations such as the adaptive behavior of firms (Beyers and Lindahl 1997a). Using survey data focusing on changes in services sold, changes in client types, and changes in export markets, Beyers and Lindahl tested the Ansoff model of adaptive behavior, with the results clearly indicating that producer service firms engaged in adaptive behavior had higher growth in sales than those that were not adaptive.

The behavior of producer services located in rural areas, rather than the city regions, was also a potential source of variation in local versus non-local transactions. Based on an analysis of a national sample of producer service firms in rural counties in the US, Beyers and Lindahl (1997b) found that 43% of the firms were strongly engaged in selling their services in nonlocal markets, with most being niche market players. These firms were categorized as Lone Eagles (proprietors) or High Fliers (strongly exporting firms with employees). Quality of life, cost concerns, and proximity to the location of the firm's headquarters were primary location considerations, along with other personal factors. Those working for export-oriented firms often traveled to meet with their clients and generated higher revenues per worker compared to locally oriented firms.

Finally, the results from eight surveys of producer services markets, some of which are referenced in this entry, were usefully summarized by Illeris. He reported that local markets varied from about 32% to 71% of sales, with an average of 49%. Put another way, the Illeris compilation indicates that just over 50% of producer service markets were non-local or export (Illeris 1990, 146).

5. Services Trade—Evidence from Input-Output Models

Useful insights on the scale and geography of trade in services are available from studies and reports that rely on a mix of primary and secondary data. An alternative source of data on the use of and trade in services is data from input-output models. In the United States these models are estimated annually for the national economy, and every five years at a more detailed industry level in “benchmark” tables. These models document the value of purchases of producer services by industries, as well as households, governments, investors, and on export accounts.

Anne Carter reported on the increasing importance of producer services in a landmark analysis of structural change in the American economy utilizing U.S. input-output models. Advertising was the fastest growing portion of the business service sector in the time periods analyzed (1939 to 1947, and 1947 to 1958) and, citing Greenfield's work, Carter wrestled with the reasons for this growth. While there were "costs of coordinating a growing volume of specialized transactions", externalization (the shift of provision of services internally in a sector to their external procurement) is also important: "Only part of the growth of the service sectors represents actual increases in the total volume of services performed. The rest is the transfer of service functions from firms and establishments primarily engaged in manufacturing and other product-oriented activities to specialized service sectors." (Carter 1970, 65). The data on this trend were sketchy, but she noted increasing contracting out for research and development services, for banks to increasingly "perform record-keeping and information-storage functions that were formerly in the province of bookkeeping departments of customer establishments. Similarly, insurance companies assumed an increasing proportion of risks formerly taken by the insured companies themselves. Some of these services, such as workmen's compensation, are mandatory. Specialized record-keeping and computer services have been growing rapidly. Such business services range from very sophisticated data retrieval schemes to assisting small businesses in coping with tax regulations. To a greater and greater extent exploratory and trouble-shooting research on engineering and business problems have been delegated to consulting organizations. Advertising work is more centralized in specialized agencies. Complex equipment, including cars and trucks, is beginning to be rented more frequently than being bought outright." (Carter 1970, 65, 68).

5.1 *Purchases and imports*

Apart from the national level, input-output models at the level of a region can also provide data on the demand for and trade in producer services. In practice such models are rarely based on survey data, and are generally derived by adjusting national input-output models inter-industry structure to produce regional multipliers, rather than a full transactions table with estimates of imports and exports. However, a set of eight models stretching from 1963 through 2007 are available for Washington State, that can be used to estimate spatial aspects of trade in services. When combined with data from the U.S. national input-output models, it is possible to compile very useful portraits of changing levels of services purchases. Table 1 summarizes these data for the greatest level of detail available over the history of the Washington input-output models. In some cases the U.S. data have a smaller value than data from the Washington models; in these cases it was assumed that the Washington data were the appropriate estimate, and that imports from the rest of the United States were zero.

The data in Table 1 indicate a significant increase in the share of total purchases accounted for by services over the history of the Washington input-output models. Regional services purchases increased from approximately 9% in the 1960's to approximately 18% in recent years, while nationally service purchases have increased from 15% to 26% of total inputs (It should be noted that these percentages are as a share of total purchases, which include purchases of labor income and other value-added payments, and purchases of goods.) Let us turn to histories of purchases for the lines of service industries captured in Table 1.

Washington State

	1963	1967	1972	1982	1987	1997	2002	2007
Transport	1.45%	1.37%	1.47%	1.54%	1.14%	1.20%	1.19%	1.62%
Utilities	1.64%	1.54%	2.06%	2.93%	2.57%	2.36%	1.41%	0.76%
Trade	1.89%	1.30%	1.83%	2.06%	2.74%	2.32%	2.45%	3.40%
Producer	3.00%	3.13%	3.12%	3.51%	3.90%	9.56%	9.98%	9.20%
Other Services	1.62%	1.36%	4.17%	4.77%	3.72%	3.30%	2.62%	2.22%
Tota	9.59%	8.69%	12.66%	14.81%	14.07%	18.73%	17.66%	17.20%

United States

	1963	1967	1972	1982	1987	1997	2002	2007
Transport	2.1%	2.1%	2.1%	2.3%	2.0%	2.0%	2.0%	2.1%
Utilities	1.5%	1.4%	1.5%	3.2%	1.8%	1.1%	1.1%	1.1%
Trade	2.8%	2.8%	3.0%	2.5%	3.0%	2.8%	2.5%	2.5%
Producer Services	6.5%	7.1%	7.6%	10.6%	10.9%	14.5%	16.6%	17.5%
Other Services	1.8%	2.0%	2.1%	2.7%	2.5%	3.7%	3.8%	2.9%
Total	14.7%	15.4%	16.3%	21.2%	20.2%	24.1%	26.1%	26.2%

Table 1 Services Intermediate Purchase Estimates, Washington State and United States(% of Total Purchases)

Figure 3 shows a clear upward trend in the economy-wide purchase of producer services as a share of output in the United States. It also shows Washington State purchases as a share of output over time, along with the difference between national purchases and Washington regional purchases (these are interpreted here as the implicit imported share of producer services to Washington businesses). These estimates are approximate, since the industry mix in Washington differs from the U.S., and patterns of purchase within particular industries may differ between Washington State and the same industry elsewhere in the United States.

Figure 3 is derived from the history of the Washington and U.S. input-output models and shows the percentage of total purchases accounted for by producer services from 1963 to 2007. (The author has estimated values for some of these years, as detail was not sought in the surveys for these purchases). The large increase in the 1987 to 1997 time period is undoubtedly related to the shift from the Standard Industrial (SIC) system to the North American Industry Classification System (NAICS), in which some activities were reclassified from industries such as manufacturing to producer services. One example of this type of reclassification is headquarters activity, that was classified as “administrative & auxiliary” employment in each broad class of industry (such as manufacturing or construction) in the SIC system, but transferred to “management of companies” in the NAICS system. The WA regional requirement is the sum of values reported in Figure 3 for FIRE and Business Services.

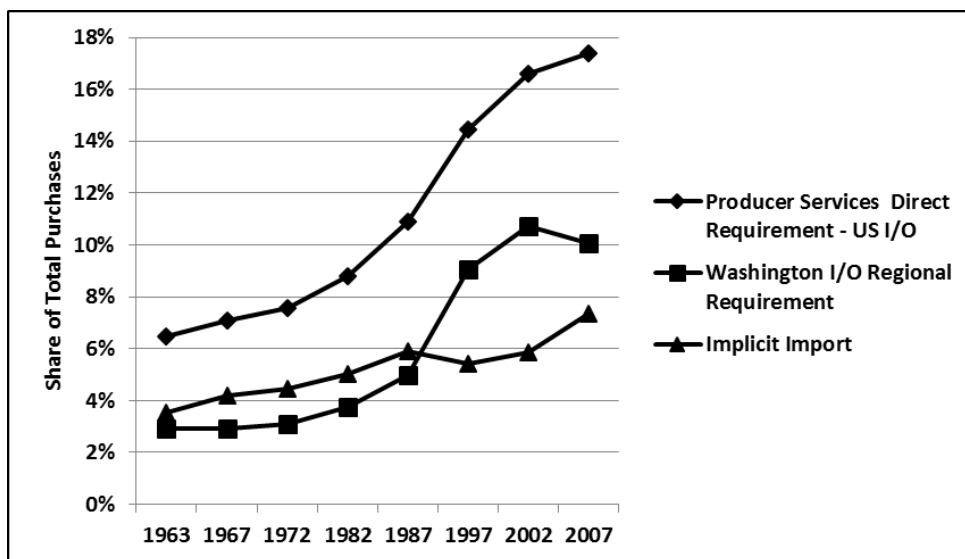


Figure 3 Producer Services Intermediate Purchases

An increase in the share of production costs accounted for by producer services over time is clearly evident in Figure 3, split in this figure between Washington State production as measured in the Washington input-output models, and between imports from the rest of the United States, implied by U.S. input-output models. Estimates of the share of imports suggest that they have diminished somewhat over the time period included in these figures, suggesting that Washington producers have supplied a somewhat larger share of total demand for producer services over time.

Figure 4 presents estimates of regional purchases and imports of transportation services. Unlike the data for producer services, that indicates a rise in regional supply and imports over time, the data for transportation services indicates stability in the overall demand for these services and in the geography of their supply.

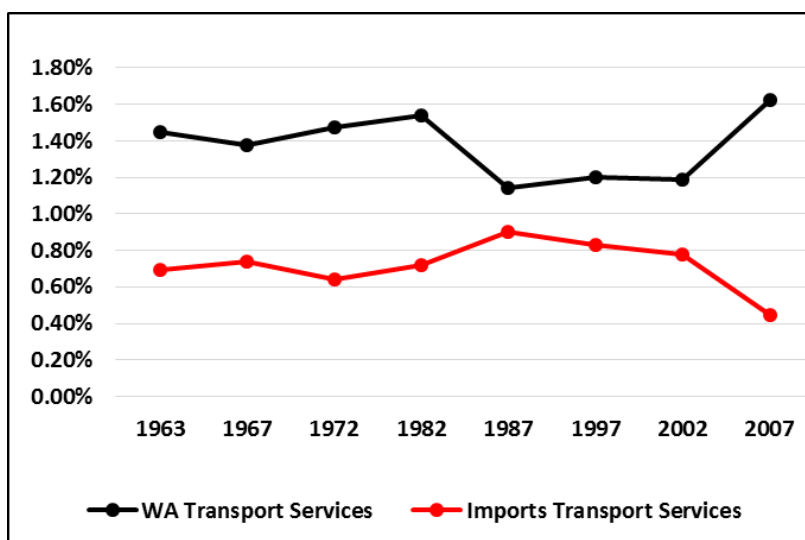


Figure 4 Transportation Services Regional Purchases and Imports

Figure 5 reports a clear trend towards larger regional purchases of trade services over the history of the Washington input-output models, and a corresponding fall in imports. Unfortunately, some of the early Washington input-output models did not distinguish between retail and wholesale trade, so it is not possible to identify which industry was the source of regional growth in purchases.

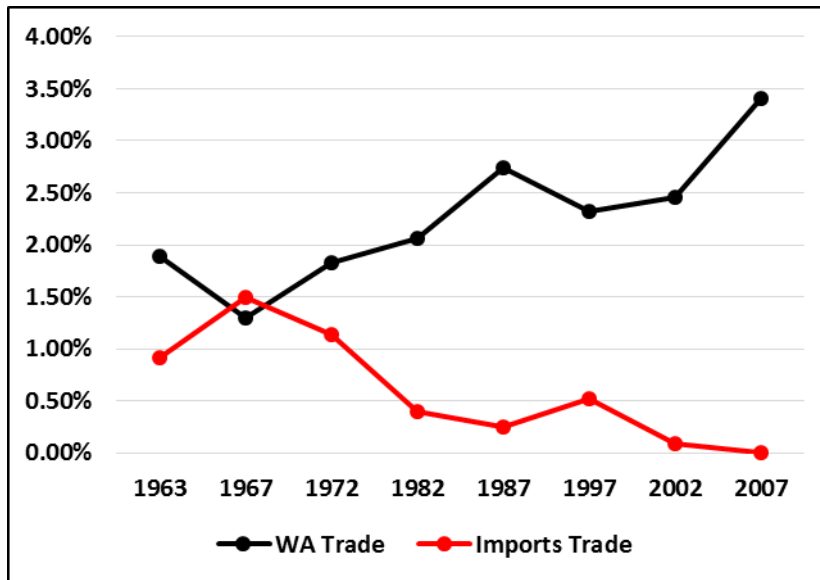


Figure 5 Wholesale and Retail Trade Regional Purchases and Imports

Figure 6 reports estimates of regional purchases of other services, and imports from the rest of the United States. Clearly, imports are modest, but appear to have risen since 1987. The rise and then fall in regional purchases is not easy to explain, but this category is dominated by types of services that likely have stronger final demands than intermediate demands (such as health care).

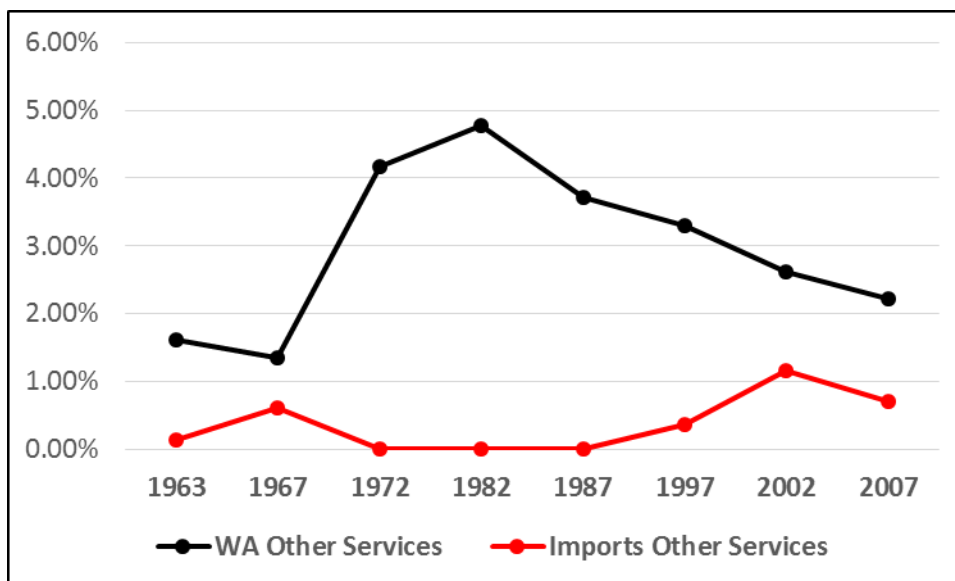


Figure 6 Other Services – Washington and Imports

5.2 Sales and Exports

The Washington input-output models also allow estimates of exports as a share of total sales, over time. These have been calculated from the series of Washington input-output models (Fig. 6). Shares of sales by service industries in Washington State in Figure 6 are divided into three broad categories: sales made within Washington State on intermediate account, sales made to Washington households, investors, and state and local governments (C.I.G), and sales made on export account. The data in Table 6 document a remarkably stable sales distribution for services on intermediate account (in the range of 25% to 30%). In contrast, sales to regional final demand contract over the history of the Washington input-output models (from about 62% of total output to about 40% of total output), while exports rise from about 10% to about 30% of total output.

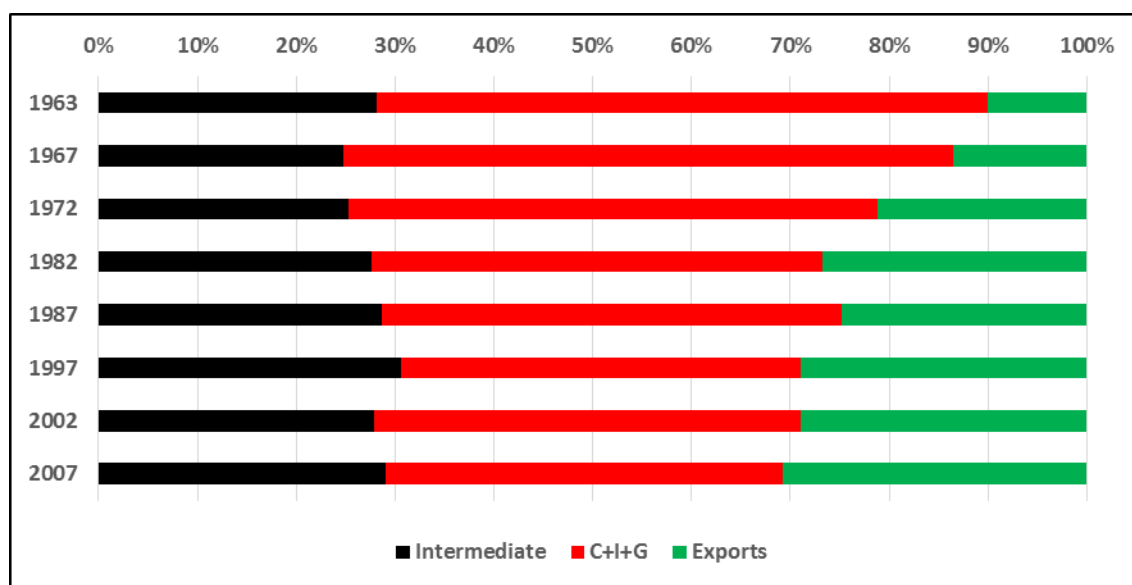


Figure 6 Sales Distribution of Washington Service Industries

While the history of Washington input-output models has gaps regarding sectoral detail for exports, overall exports as a share of total output in services can be reported. Figure 7 reports this detail. The export of services rose from about 10% in 1963 to 31% of total services output in 2007. Clearly, the growth in sales to the rest of the United States was the largest source of growth, but foreign exports also exhibit growth, while sales to the federal government have been stable.

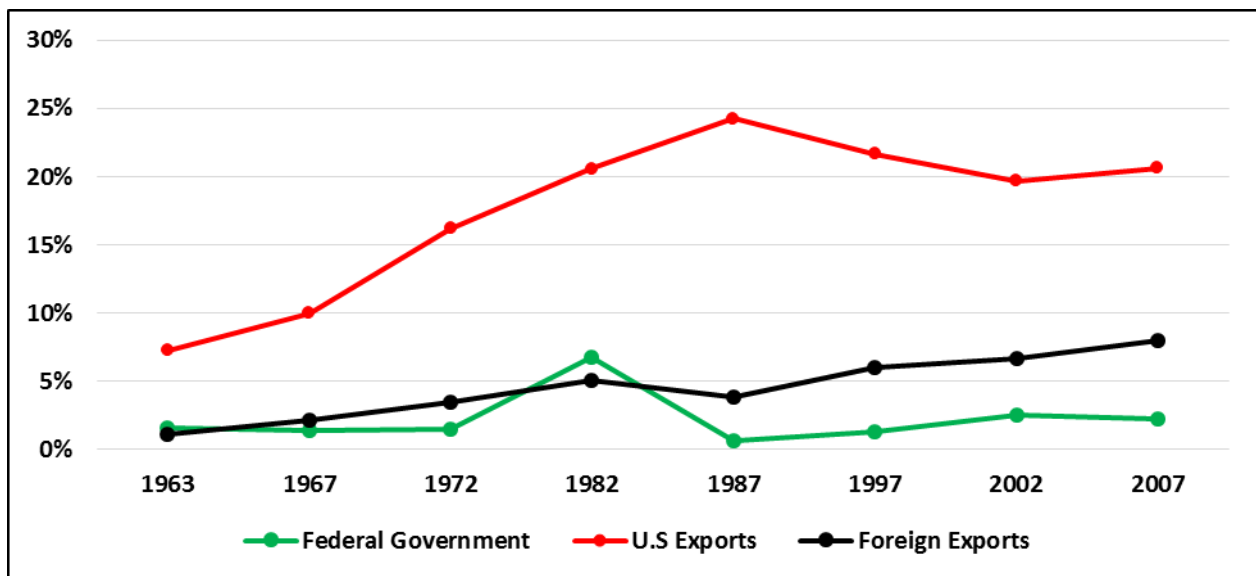


Figure 7 Overall Service Export Market Shares

The composition of exports is documented in Table 8, which documents significant structural change in export sales. Clearly, the early dominance of exports of transportation services has been replaced by strong exports of producer services. Trade and transportation service exports are linked to the export of goods, such as agricultural or forest products, and while still significant in absolute magnitude, their relative importance has been overshadowed by the strong growth of exports of producer services. It should be noted that Figure 8 (and figures 9 and 10) do not report data for 1972 and 1982 because the Washington input-output models for those years did not disaggregate trade in services consistent with the categories in Figure 8.

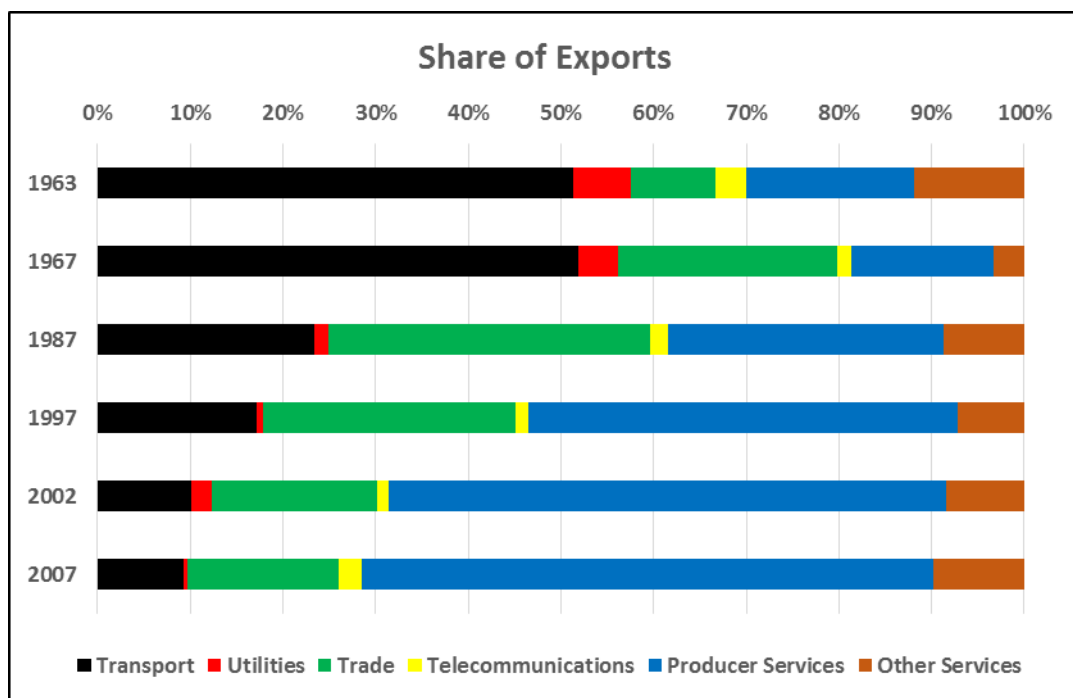


Figure 8 Share of Total Exports by Sector

Figure 9 reports the pattern of sales on intermediate account to Washington businesses by all service industries. This figure reports less dramatic structural change in markets than reported in Figure 8. Transportation and trade margins remain important, in relation to the purchase of commodities used in the production process. Utilities output is dominated by electricity in the Washington economy, and the reduction in the share of output associated with this sector is no doubt related to the contraction of the aluminum industry that was a major consumer of electricity in the 1960's, and has almost disappeared from the Washington economy by 2007. The increased share of sales of producer services mirrors data presented earlier that documented the growth in purchases of these services as a share of output over time.

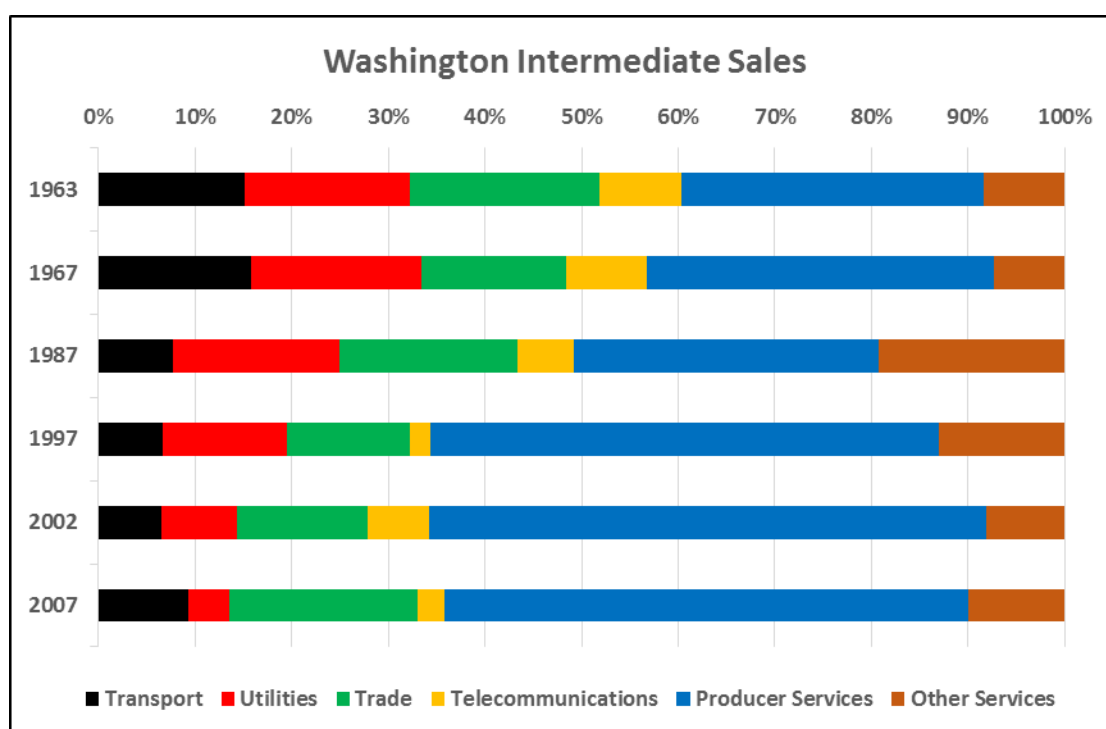


Figure 9 Intermediate Sales by Sector

A final perspective on changing service markets is presented in Figure 10. This figure documents the share of services sales made to households, on investment account, and to state and local governments. This figure reports strong markets related to trade, reflecting the importance of trade margins (and transportation margins) associated with the distribution of goods through retailers. The growth of other services importance is no doubt related to the expansion of demand for health services, and other consumer services such as repair and entertainment. While producer services markets are primarily with business and government, Figure 10 does report an expansion of markets to households, investors, and state and local governments for producer services. Growth in sales of financial and real estate services to households, and of legal services to households, are examples of sales by producer services to these industrial markets. While modest in magnitude, telecommunications and utilities appear to have had relatively constant shares of markets to households, investors, and state & local governments.

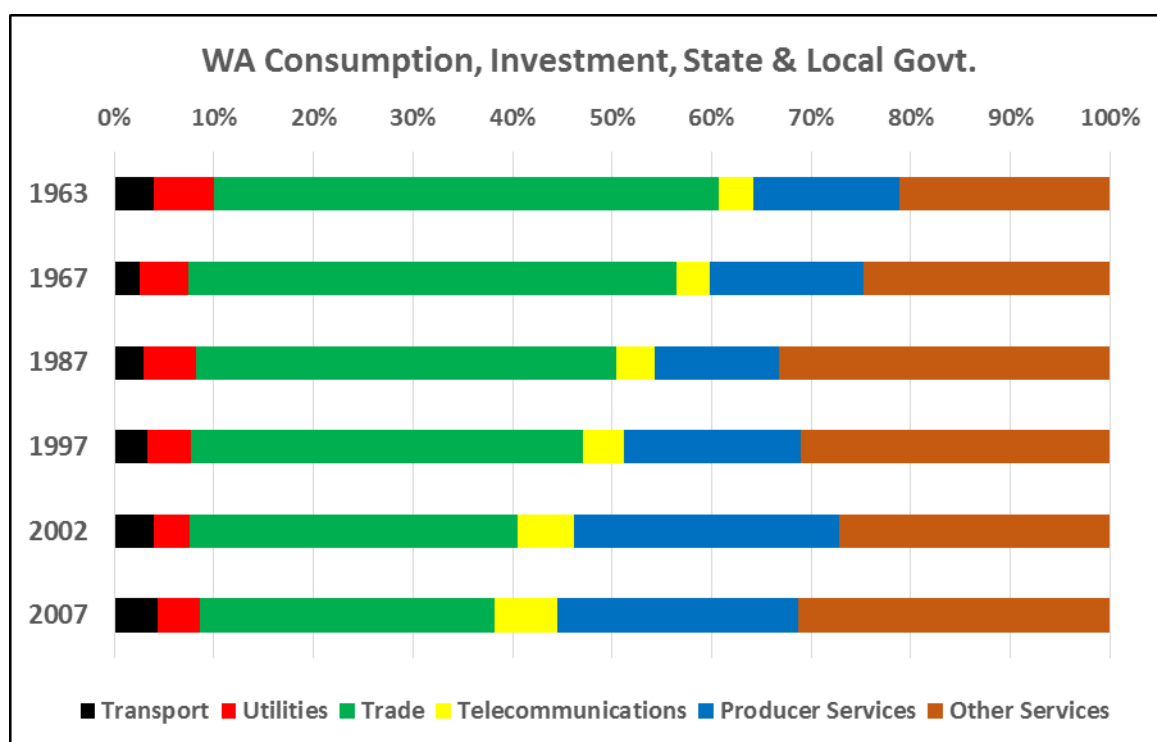


Figure 10 Washington Service Industry Sales to Consumers, on Investment Account and to State and Local Governments

6. Concluding Comments

This paper has documented the dynamics of trade in services in the Washington state economy over half a century. Placed in the context of earlier work that has argued the growing importance of trade in services, the Washington data represent a unique regional data series providing hard evidence about the growing importance of trade in services. Washington state may differ somewhat from other states with regard to the service economy, but the data presented in this paper on services purchases document consistency between the Washington state input-output accounts and the U.S. national input-output accounts. It would be interesting to explore the possibility of analyzing historical European input-output data to determine if similar patterns of change in exports and imports in services are documented. The lack of hard statistical data on trade in services from government agencies such as the U.S. Bureau of Economic Analysis is a major omission in economic statistical data, given the domination of services output and employment in states and regions in countries such as the United States today.

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Between the centre and the margins: Services location, economic (re)structuring and quality of life in metropolitan periurban areas

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This paper aims to discuss the specificities of the role of services in the economic structuring and in the social liveliness and attractiveness of periurban areas. Drawing upon on the result of an empirical work developed in 5 different parishes of Lisbon Metropolitan area, which represent five categories of periurban spaces previously identified, it is analysed the role of services in these “in-between” territories and the way they are important in the spatial economic structuring of these areas and in the quality of life and well-being of their inhabitants and users. A tentative typology for framing the analysis of the role of services on periurban metropolitan spaces is suggested and some policy implications are pointed out.

1. Introduction

The aim of this paper is to discuss the specificities of the role of services in the economic structuring and in the social liveliness and attractiveness of periurban areas, drawing on an empirical work developed at Lisbon Metropolitan Area (LMA).

Periurban areas present specific characteristics in terms of the competitive factors they develop to attract economic activities, users and residents, which make them special in terms of contemporary metropolitan contexts. Specific types of economic activities and specific branches within economic value chains (from logistics to agriculture, from proximity services to KIBS, from clean energy supply to specialized exported oriented businesses, from specific touristic branches to environmental protection services)

find their place in these areas, and services have a fundamental role on it. At the same time, the social restructuring of these areas, marked by increased territorial and social mobility(ies), and permanent identity challenging processes, is intimately marked by these service activities, that, on one hand, condition the attractiveness of residents and users, but on the other hand, are the result of these new social composition and the fruit of the re-composition of the needs of that population.

The role of services in these “in-between” territories and the way they are important in the spatial economic structuring of these areas and in the quality of life and well-being these areas provide are clearly understudied, and this paper’s objective is to problematize that issue, drawing on the result of an empirical work developed in five different parishes of Lisbon Metropolitan area, which represent five distinct categories of peri-urban spaces, previously identified.

Next section introduces the framework in which this paper was developed (the PERIURBAN research project), its main phases, and the methodology used in the part of the research that was mobilized for this article. In section 3, a discussion on the structuring and dynamics of periurban spaces is held, and the main characteristics of LMA periurban area (and of the 5 parishes studied) are presented. Section 4 provides a more focused discussion on the role of services in LMA periurban, and presents a tentative typology of services regarding the general analysis of periurban territories. A brief concluding note refers to the issue of policy implications, in terms of territorial planning policies.

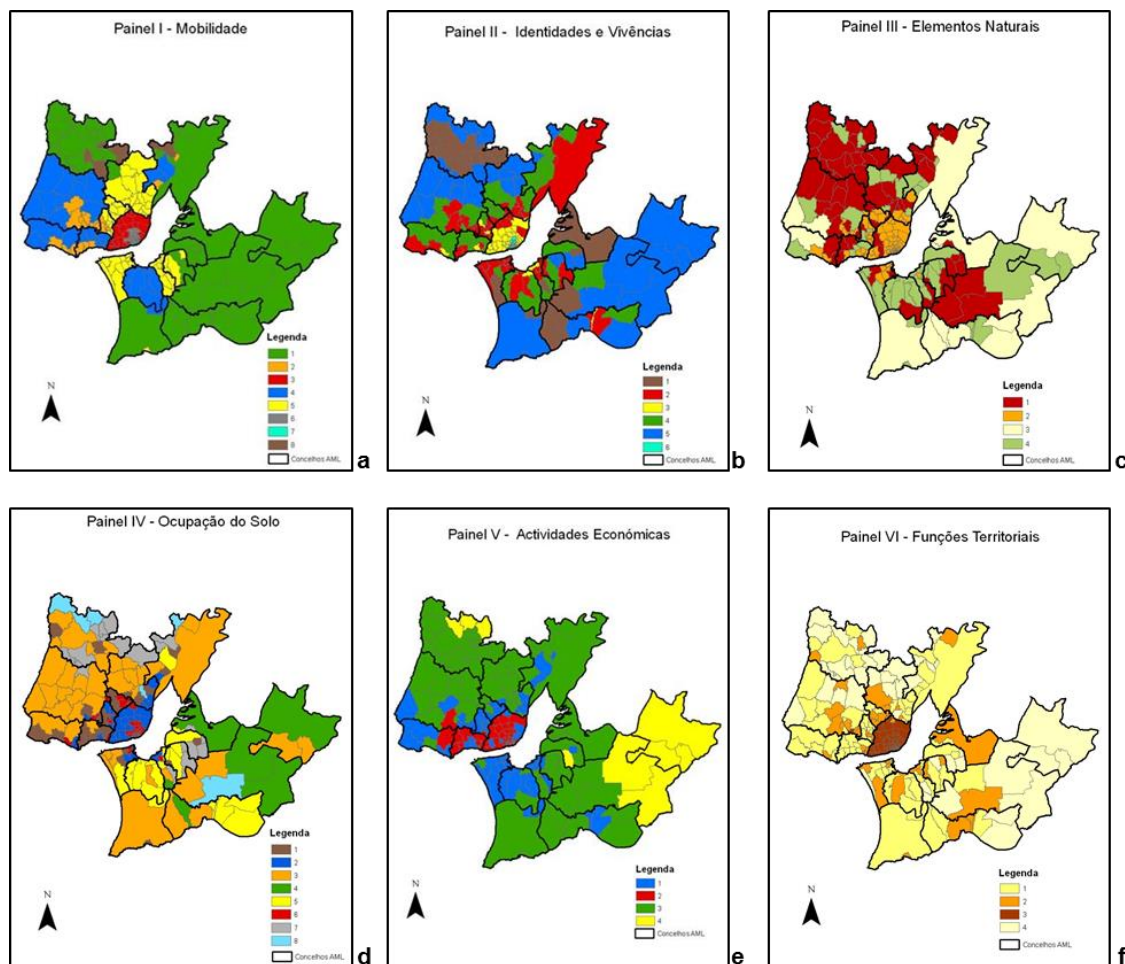
2. Context and methodology

The paper is developed under the broader scope of a funded research project on the challenges that periurban areas of Lisbon Metropolitan Area face to achieve sustainability, the PERIURBAN project¹). The main goal of this project, involving different Portuguese universities, crossing academic fields and integrating the knowledge of stakeholders from diverse institutional and territorial (local and regional) backgrounds, is to assess the potential of periurban areas to meet future challenges for sustainable development in a changing world. It aims to look in-depth into the periurban areas of Lisbon Metropolitan Area with their physical, environmental, social, economic and institutional characteristics, using a prospective approach.

¹ “Peri-urban areas facing sustainability challenges: scenario development in the Lisbon Metropolitan Area” [PTDC/AUR-AQI/117305/2010] funded by Portuguese Science and Technology Foundation (FCT).

In the first phase of the project a typology of periurban spaces in the Lisbon Metropolitan area has been identified, starting from a thorough diagnosis, at six different levels (Mobility; Identities and Experiences; Natural Elements; Territorial Functions and Topology; Occupation; Economic Activities), which made it possible to map, based on a cluster analysis, a set of different types of parishes in AML, among which we have defined 5 types of periurban territories (cf. Gonçalves et al, 2015, for details). Figure 1 shows the typology of periurban territories resulting for each of those 6 analytical levels, and figure 2 presents the final typology of periurban spaces which resulted from the integration of those 6 dimensions and clusters analysis.

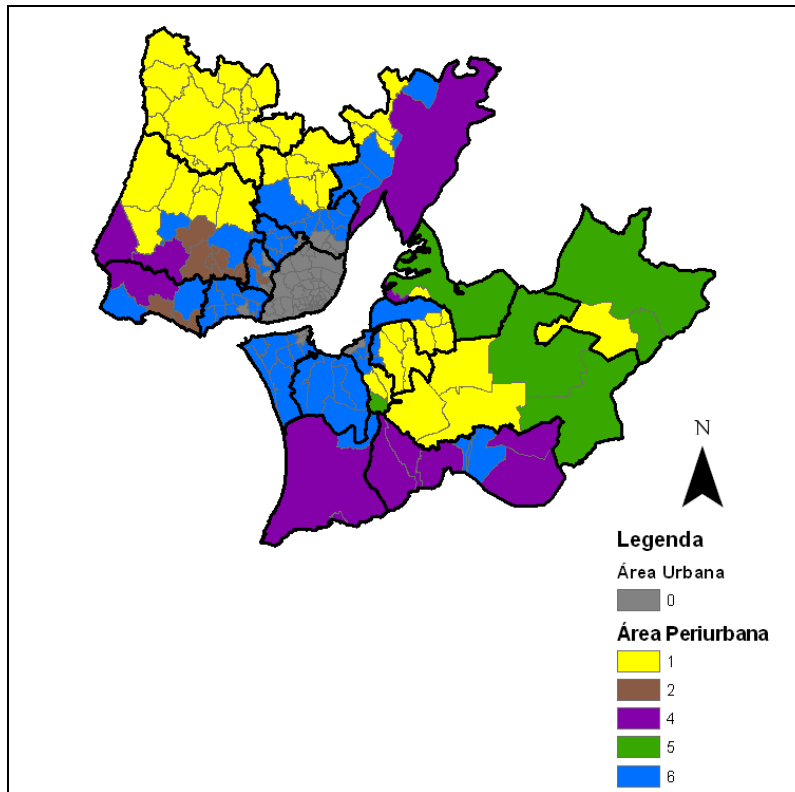
Figure 1: Typologies of periurban territories in LMA, in each of the 6 analytical dimensions



Source: own elaboration (PERIURBAN project)

Five different types of periurban were identified (Figure 2), plus one category of more “pure” “urban” space, which was discarded of our analysis. Details on the characteristics of each of these 5 types of periurban spaces can be found in Gonçalves et al (2015).

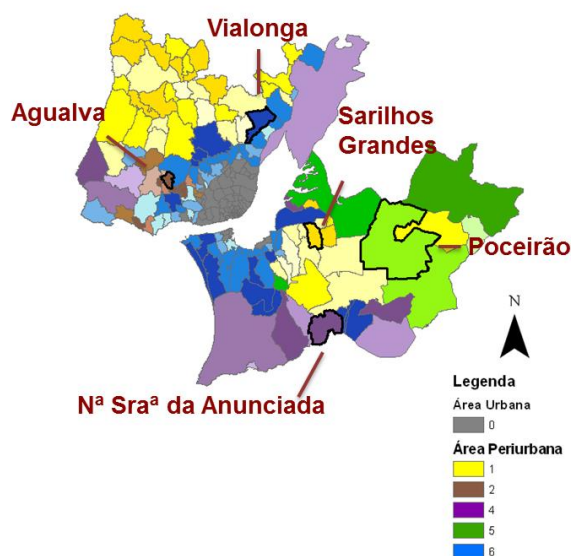
Figure 2: Final typology of periurban territories in LMA



Source: own elaboration (PERIURBAN project)

In a second phase of the project, and drawing upon a more detailed analysis, based on quantitative and qualitative methodologies (including, but not limited to, interviews, the application of a survey and a discussion of visual material recollection on the territories concerned), we proceeded to an in-depth study of 5 parishes which were assumed as representative of each of these clusters (Nossa Sra. da Anunciada; Sarilhos Grandes; Poceirão; Vialonga and Agualva – cf Figure 3), considering the challenges to the sustainability of these territories within the timeframe given by the project, based on a characterization of the current situation and a discussion with local stakeholders on scenarios for its future development.

Figure 3: Selected parishes ("parishes-type", representative of each typology):



Source: own elaboration (PERIURBAN project)

This analysis was based on an in-depth evaluation carried out at five distinct levels, which constitute what we've called "the pentagon of sustainability": the "physical" system; the "ecological" system; the "social" system; the "economic" system; and the "institutional" system. For each one of these "systems" a methodology was developed in order to access the conditions for sustainability in that particular field, and specific analytical tools were put in practice.

In this paper, we focus specifically merely on part of the results obtained on this second phase of the project, namely, in just two of those five analytical dimensions: the "economic" and the "social".

Based on the information collected via interviews (with 50 selected stakeholders, e.g. local and regional administration, associations, businesses, schools, employment centers, firefighters), survey (applied to 600 individuals, with a stratified sample, in the 5 parishes) and visual recollection (observation with a photographic approach, involving 2 days of observation, 7 specific points at 3 times slots in each parish), and crossing these 3 methodological sources (also with the second-order information recollected statistical data, information from municipalities and parishes, planning documents, etc.), a discussion is made in order to establish a profile of periurban services, and to inquire the way services condition and (re)produce the economic (re)structuring patterns and identity(ies) and quality of life in metropolitan peri-urban areas.

3. Periurban territories and metropolitan (re)structuring

3.1. In-between spaces: periurban between centres and the margins

Periurban territories, particularly the metropolitan ones, can be seen as “in-between” spaces, mixing and making the transition between urban and rural economic forms of organization, as well as social and cultural practices, attitudes, values and identity construction aspects. This can be reflected on a variety of declinations in the production-consumption systems, in lifestyles, in identities and, generally, in all social, cultural and economic processes, which make these areas also interesting spaces of heterotopy and liminality.

The specificities of these spaces are clearly understudied and often are underestimated due to the visibility of the globalization processes and the competitive processes between agglomerations (e.g, amongst metropolises, or among these and smaller towns) to attract residents, users, tourist or economic activities. But the specific competitive advantages of these periurban areas should be examined more thoroughly, as they are important in the contemporary intra-metropolitan (re)structuring processes as well as in the potential these areas can provide in the external affirmations of those territories, at economic, social, cultural or ecological levels, for instance.

The changing pattern of population occupation, settlement characteristics, economic activities or social practices observed in these areas, can be observed both in what relates to economic activities as socio-cultural and identities construction (beside physical, ecological, and morphological dimensions, or other that are not the specific concern of this article).

Considering economic activities, periurban territories are characterized by complementary relations between urban and rural systems. This links result from the flow of products, information and people as from the connections between sectors related to agriculture, manufacturing, and services (Pradoto, 2012). This is expressed in a complexification and mixing of the traditional accounting “sectors” which increases a “smoke screen” on the economic structure of these spaces, where various kinds of services are clearly underestimated: ‘The flow of goods, people, capital, and economic sectors overlap at both household and wider levels creates reciprocal linkages between agriculture, manufacturing, and service as part of the urbanization’ (Tacoli, 1998).

Pradoto, (2012) argues that there are three main processes modelling the transformation of rural-urban economy, including: (i) the relocation of manufacturing and service industries in peripheral areas of the city due to lower rent prices that, in turn, attracts people to leave the city and reside in periurban areas; (ii) the declining of local employment, forcing young people to migrate out and engage in non-farm work; and (iii) the demand of middle class for a better quality of life by residing in a green environment in the peripheral zones.

Periurban is influenced by both rural and urban dynamics. The influence of a metropolitan area is expressed by continuing investments in peripheral areas that offer sources of labour and land. The presence of industries, services, logistics and distribution platforms, SEZ (Special economic zones) enterprises, housing, big store chains etc. constitutes physical manifestations of this realm. Plus, and in parallel, the coexistence of a rural – agriculture matrix establishes a hybrid territory where distinct activities occur like the one related to agro-industrial, distribution but also to food subsistence and pluriactivity, etc. This complex set of conditions defines distinct degrees of specialization/diversity of the economic tissue. The analysis conducted during the first phase of this project, acknowledges this economic diversity, including the issues of the specialization and diversification of economic activities (creating a clearly fragmented economic mosaic), the special presence of agriculture and related business and industry, and the attractiveness to new activities and real state development (cf Ferreiro et al, 2015 for details).

But these “in-betweenness” can also be seen regarding identities and lifestyles, which are intimately interrelated to territorial recomposition processes. Considering peri-urban spaces as 'in transition' and strongly marked by social and territorial recomposition, a 'flows-based' approach was adopted in order to address the 'processes of rapid economic, sociological, institutional, and environmental change' that occur in these territories (Marshall et al, 2009). Understanding inherent social dynamics in LAM, led us to the identification of trends/characteristics through the use of static and dynamic indicators. This approach made possible the distinction between urban centre and peri-urban territory, but also the identification of types of peri-urban spaces with diverse social character. Considering peri-urban as an interface of social/territorial metamorphosis, imminently 'fragmented', and composed of changing communities with distinct identities, it was necessary to translate the fragmented territorial and social mosaic (as it's inner 'movement') in a geographic image of attributes and trends. Portuguese Census (2001 and 2011) information and other quantitative data sources enabled the characterization in social terms (cf. Ferreiro and all, 2015) considering several dimensions: population growth and composition; residential mobility and social diversity; family types; types of housing; territorial reconfiguration; spatial inequalities; community relations).

This process allowed us to understand better the processes and interdependences that may express what can be called of 'peri-urban' (Berger, 2004), giving us some preliminary hints on how to disentangle this relation between territorial restructuring, identity and community relations on those transitional spaces (cf Ferreiro et al, 2015 on this).

The social restructuring of these areas, marked by increased territorial and social mobility(ies), demographic and sociocultural change, and permanent identity challenging processes, is intimately marked by the service activities, that, on one hand, condition the attractiveness of residents and users (as amenities which are increasingly required by larger segments of population), but on the other hand, are the result of these new social composition and the fruit of the re-composition of the needs of those populations.

3.2 . The periurban in LMA: growing attractiveness in a metropolitan restructuring context

The attractiveness of the periurban areas is stated in the specificity that these can offer between an "urban" territory in progressive expansion and a "rural" in transformation and reconfiguration. This is particularly visible and complex in metropolitan areas, such as the one studied. In situ urbanization dynamics coexist with the "oil-stain" expansion of the urbanization process, in a framework in which the dynamics of mobility and accessibility have a key role in the expansion of economic activities for the urban peripheries, which were progressively structuring the territorial occupation. This expansion, clearly visible throughout the 20th century in Lisbon Metropolitan area, both in the North as in the South banks of Tagus River, along the main road and rail routes (and, in recent years around new axes, as the one defined by the Vasco da Gama bridge), marked the demographic expansion to the peripheries, successively in a 1st, 2nd and 3rd crowns around the centre. This entailed the relocation of support services to all these populations, and a dynamic economic activity of proximity (small commerce and support services to families, in areas such as food and restauration, aesthetics, health, leisure, car equipment and repair, as well as small business support services - accounting, informatics etc.), which was gradually spreading across the territory, in addition to activities associated with construction and building activity and with residential equipment cluster (household equipment, furniture, gardening, ...). The centres of the residential agglomerations and small settlements, some more traditional, other more modern, were thus progressively consolidating its economic role as providers of services to nearby surrounding, of variable dimension (i.e., with a diversity of hinterlands).

On the other hand, along the same routes, the offer of more "heavy" economic activity, be it industrial oriented, or be it (mostly) in the field of the

activities related to logistics, distribution, storage or wholesale, exploring the benefits of accessibility, and the cheaper costs of land and labour, was structuring according to the specific competitive advantages of each territory (from the existence of natural resources, as in the case of extractive industries, to the locative centrality with regard to export channels, or the ease of obtaining manpower available, for example). This process gets a supplementary impulse with the economic dynamics related to contemporary globalisation processes, having these spaces often a capacity of global hyper-connectivity that is result from the combination of exogenous and endogenous competitive factors that can be mobilized in the face of its metropolitan location and the resulting advantages of scale and connectivity (see for example the case of "Auto-Europa", the country's largest exporter, or others). New centres were developing in such a process, for instance technological and industrial parks, logistics poles, spaces for energy infrastructures, or shopping malls of relative large dimension, polarizing a more specialized trade, throughout the metropolitan area, these days. The existence of physical space transforms easily these periurban areas in a "platform" for strategic regional investment (when not even national or transnational), functioning as a pool for new specialized activities, infrastructure and housing, what ends up reflected in land price pressure and, often, in real estate speculation, which may be more or less articulated with the local or regional planning logics.

In parallel, activities focused on the direct exploitation of more traditional territorial resources (in particular farming and agro-industrial activity, and also fishing), as well as the exploitation of the touristic resources (in particular those associated with seasonal and weekend spend and secondary residences), but also, increasingly, to leisure and to the use of protected and preserved areas) were adapting to this profile of transformation, co-existing and competing with it, and providing services more or less specialized (albeit often seasonal) to a floating population that uses regularly these areas. In the case of agricultural activity, which is striking in the occupation of the soil in much of this periurban territory, the progressive co-existence with other activities and the pressure of the real estate market have led not only to a loss of land for other activities, but also, in cases where the component "rural" is still as dominant, to an increase of the plural-activity of farmers, to the abandonment of land, or to the recourse to subsistence farming familiar. These are phenomena that develop in parallel, conversely, to the intensification of more focused and intensive-production specialized activity and to the conjunction with the agro-industry, clearly market-oriented, as well as in more punctual exploration of new production and distribution mechanisms and market niches (organic farming, short circuits, etc.).

The fragmented economic mosaic that characterizes Lisbon's metropolitan periurban fabric is therefore defined in a constant tension between diversification and specialization, in each concrete space, in which the various competitive factors gain shape and provide opportunities for the location (sometimes temporary, others more definitive) of various activities, in

conjunction (more or less achieved, depending on the specific cases) with the more traditional activities and occupations of those same spaces.

Considering the five parish-type we analysed, this pattern is clearly noteworthy, as much as some of these typical activities of the current peri-urban fabric (the big shopping centre, the industrial and logistic pole, the technological pole) can be sometimes outside of the physical border of these parishes (though on a substantial physical, affective and symbolic proximity).

Therefore, generally coexist in these spaces, on the one hand, highly specialized activities, with very large hinterlands (which can be of large size, such as beer in Vialonga, cement in N^a Sra da Anunciada or some wine production in Poceirão; but also of smaller dimension, as the highly internationalized flower industry of Sarilhos Grandes, or even informal – and illegal – fishery activity in the same parish), and on the other hand, a very diverse range of activities, essentially services, which can be more or less specialized (provided for residents of and/or businesses), or small-scale commercial activity and logistics, with highly variable hinterlands (mostly in the cases of N^a Sra da Anunciada and Agualva).

This proximity economic fabric, striking in all the parishes, in some cases is more concentrated around the main urban areas and major roads (Sarilhos Grandes, Poceirão, and even Vialonga), but in other cases is more decentralized and is based on a multiple polarization within the parish (mainly in N^a Sra da Anunciada and Agualva).

Some particularities mark, apart from this, the profile of each of the territories analysed, which we will present briefly in the next section.

3.3. The five “parishes-type”: five examples of an evolving peri-urban socioeconomic structure

a) Agualva

Economic activities in the parish of Agualva are essentially related to the small local commerce and services associated with the high population density and the housing market, which can be considered the predominant. There are also some industrial poles with a certain dimension, such as the one at Colaride, where the presence of a pharmaceutical industry small cluster stands out. The factors of attractiveness of the parish are related to its location near the metropolitan employment centres (Lisbon) and exporting flows, the rail and road access (IC19/A16/Sintra railway line), the low value of the soil, the availability of space and the human capital represented by a volume of population of 80 thousand inhabitants.

Yet, there are problems related to the commuting flows associated with job polarization in the city of Lisbon, since the cost of journeys to other parishes of the municipality of Sintra is higher than the cost of travelling to the capital. The parish is thus a dorm-territory where there have been progressive processes of urban decay, combated using public investment programs for requalification (e.g., POLIS-Cacém), trying to induce a new push in the housing market and in private investment. The construction of a range of more consistent competitive advantages to attract activities with higher hinterlands is particularly important in the face of competition from several other territories in the surrounding parishes, both in the municipality of Sintra as in Oeiras (including Taguspark science and technology pole, nearby).

b) Vialonga

Vialonga presents some diversification in its economic fabric, with the co-existence of economic activities related to logistics and distribution, industry, hypermarkets and a lively housing market, to which are associated the local proximity commerce, the provision of services, or the social economy. In logistics and distribution stands out the presence of companies like DHL, in industry, Central de Cervejas (largest employer of the parish), as well as the catalyser presence, in the neighbouring parish, of the MARL (Lisbon region supply Market), with very significant effects on local economic activity; in the housing market, the presence of companies related to the construction of recent residential neighbourhoods that have streamlined the local trade and services. The existence of social housing neighbourhoods and socio-economic difficulties led also to an important presence of the social economy sector.

The factors of attractiveness of the parish are related to its location (near the A1, A8, CREL highways), the proximity to the supply centres in the area of large distribution and wholesale, the advantageous soil value, the presence of important complementary commercial relations (e.g. MARL with distribution and logistics companies), as well as the existence of human resources with some level of qualifications (lower rate of unemployment in the municipality of Vila Franca de Xira). The area has also endogenous resources that give interesting competitive advantages, such as high-value soils, in ecological terms, in the area of "várzea de Vialonga" (currently existing conflicts between the occupation for new companies and their protection and utilization for agricultural production), geological resources (quarrying) and energy assets (solar and wind). The parish counter-cyclically increased its economic dynamism between the first half of 2011 and 2014, slowing down from that time for reasons of national economic crisis. The current development constraints relate mainly to the conjunction between residential and business and to the conflict between the occupations of areas of high ecological value for new investments. Al-

so in the housing market, the foreclosures for inability to pay loans are driving to a certain retraction.

c) Nossa Senhora da Anunciada

Nossa Senhora da Anunciada is a parish which has part of its territory inserted in the city of Setúbal and the other corresponds to a rural area under the jurisdiction of the natural park of Serra da Arrábida, being also marked by an extensive riverfront and seafront. This allows understanding well the parish in terms of the diversity of existing economic activities. The fact that of being located in the urban context, in a region capital (Setúbal city), boasts central functions expressed through the presence of district hospitals, court, social security, regional services, etc., which are important sources of employment, as well as enhance the polarization of some private economic activity, in the fields of trade and services, with supra-local hinterlands.

The economic fabric in the urban context of the parish is, nevertheless, mainly characterized, above all, by the importance of local trade, standing out the restaurants, bars and shops associated with local products (fish, wine, cheese, etc.) the nightlife establishments (bars, clubs) and the services (although some of them polarize a market which corresponds, at least, to the whole of the city, and not only to the parish). Industrial dynamism associated to natural resources (SECIL cements) or the presence of infrastructure (port of Setúbal) can be also immediately identified. In its rural area, the farms of rural tourism, small enterprises of production of wine, cheese and butter, and subsistence agriculture stand out. The presence of the sea, the fishing port and fishermen's cooperatives determine also an important part of the fishing activity in local economy (in conjunction with catering establishments) and the informal dynamics associated to these. Tourist activities associated with the natural and cultural heritage of the parish are also emerging, as expressed by the opening of some hotels, new rural farms touristic facilities, the development of maritime activity-tourism, or Arrábida's candidacy to world heritage. There is a local government effort to promote the regeneration of the riverfront, rehabilitating industrial zones and brownfield areas, and installing new equipment capable of regenerating the urban context and attract foreign visitors. The tourism associated with local activities and local heritage is seen as the main factor of economic attractiveness once there is no more room for allocation of space to industrial activities in the parish (due to legal and regulatory constraints of the natural park).

d) Poceirão

Poceirão is a markedly rural parish which corresponds to half of the municipality of Palmela. Agriculture, viticulture, cattle raising and the forestry sector, denoted by the production of cork, are the predominant economic activities of the parish, with some scale and degree of integration both at internal and external markets (e.g. wine). The attractiveness of this territory for those economic activities relates to its flat orography, fertile soils, water availability (largest aquifer of the Iberian Peninsula), the structure of land register, based on large property, the proximity to supply centres on LMA, and the existence of specialized labour and 'know-how' in those areas of activity.

The endogenous characteristics of its territory also determine its attractiveness in relation to major investments expected (but suspended), such as the Lisbon-Madrid high-speed railway link (TGV), the new Lisbon Airport (NAL) and the logistics platform supposed to be able to increase the hinterland of the ports of Lisbon, Setúbal and Sines. The direction of the economic development of the parish (more agricultural oriented, more related to logistics and transport activity, or a mix of the two) will be so dependent on the future and on the implementation of these (or other) intentions on the part of the Portuguese State. In addition to these activities, a profile of service activities and small commerce, relatively low specialized, marks the local activity, being especially implanted around the axis formed between the village of Poceirão and Lagameças.

e) Sarilhos Grandes

Sarilhos Grandes is a markedly rural parish, as the parish of Poceirão, but offers, though, several specific characteristics in respect to its territory which determine also differences with regard to the main economic activities and the attractiveness of the parish. The high degree of land consolidation and enclosure determines the presence of small businesses in the area of intensive agriculture, livestock and greenhouse floriculture. This last with some expression because of the concentration of farms in the parish and in the municipality (due to its particular climate) allow to create scale and to stabilize prices. The accessibility and the IC main road create also a potential for fast transportation to the airport which is important in the trade and export of flowers. Greenhouse production (of flowers, red fruits, etc.) is one of the factors which are most pointed to as a potential for economic development and internationalization of the parish. The accessibility (ease of access to Lisbon) and the low cost of soil

constitute factors of attractiveness; however the parish undergoes the constraints caused by lack of manpower (ageing population) and the small size of the property, preventing the installation of large companies and big investments. Due to the fact that the parish confine with the Tagus river estuary, other economic activities also emerge (often informally), related to the use of local resources (Clams, Eels, etc.) and their consumption, through specialized restaurants some of them polarizing markets with significant areas of influence. The cultural and natural heritage assets are, in fact, singled out as possible factors of development of the parish, regarding the tourism associated with local values.

Sarilhos Grandes is also considered a “passage” territory, being crossed by N10 road, along which proliferate the small industry, services, construction companies and small local businesses, mostly commercial. Employment is provided especially outside the parish. Local employment is predominantly empowered by some proximity services and by agricultural activity, which pays the minimum wage and refers largely to immigrant labour.

4. Services, sustainability, and periurban territories

In this section, we look more specifically for services activities, taking in account the results obtained in our project while assessing social and economic sustainability of periurban territories, and aiming to understand the particular role played by the diverse service activities in this kind of spaces.

4.1. The dimensions to assess sustainability

In order to achieve our project objective of accessing sustainability, both in economic and social terms, it was developed a framework which is based in a diversity of analytical dimensions, recurring to a multiplicity of indicators, which were then operationalized recurring to qualitative and quantitative data (using the diversity of sources above mentioned), in the framework of a continuous intense discussion among team members (see Costa et al, 2015a, for details).

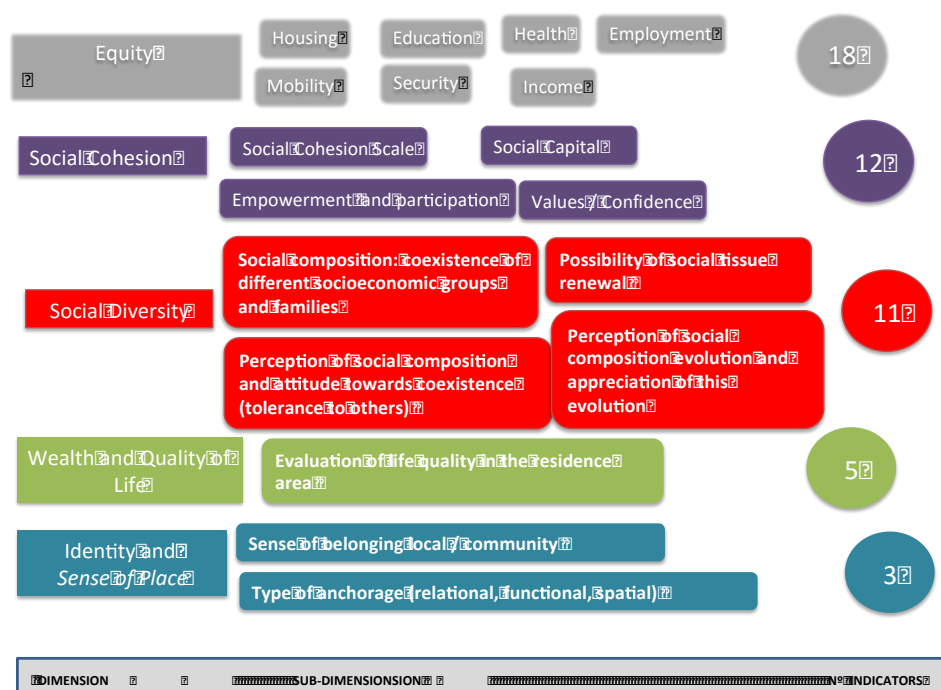
In the case of the assessment of sustainability in economic terms, 4 main dimensions were considered: (i) the capability to polarize economic activity and attract residents, users and visitors; (ii) the consistency of the productive structure and the specialization basis; (iii) the wealth factors, related with living standards, consumption and well-being; and (iv) the expectations-related factors and attitudes towards uncertainty. Each of these dimensions was subdivided in several sub-dimensions which were operationalized in descriptors/indicators. Figure 4 presents the dimensions used for the economic sustainability. A list of all the indicators used is presented on annex A.

Figure 4: Assessment of “Economic Sustainability”: analytical model



Source: own elaboration (PERIURBAN Project)

Figure 5: Assessment of “Social Sustainability”: analytical model



Source: own elaboration (PERIURBAN Project)

In the case of the assessment of social sustainability, five main dimension were taken in account: (i) the questions related to equity and to the access to services and facilities; (ii) the social cohesion issues; (iii) the question of social diversity and the ways it enhances and conditions social dynamics; (iv) the perceptions of wealth and quality of life; and (v) the issues related with identity and the sense of place. Each of these dimensions was also subdivided in several sub-dimensions which were operationalized in descriptors/indicators. Figure 5 presents the dimensions used in the assessment of social sustainability. A list of all the indicators used is presented on annex B.

Details on the operationalization of this assessment (on both dimensions) and on the results achieved can be consulted in Costa et al (2015a).

4.2. The structuring role of services: some examples

Among the dimension used for the assessment of sustainability, several can be mobilized to understand the importance of services in the structuring and vitality of these periurban areas. The results of our analysis, drawing upon the results of each specific indicator (cf. Costa et al, 2015a), can give us some hints to recognize this role of services in LMA periurban territories.

Regarding the economic sustainability assessment, it can be seen, mostly, in two of the analytical dimensions considered. On one hand, services are fundamental for the capacity of attractiveness and polarization of these areas. Their role in territorial vitality is evident concerning the capability to play central roles, at different levels (with the most diverse hinterlands, both in private and public sectors), as well as, consequently, by the “amenities” these service generate in terms of attracting residents, tourists or other economic activities. The situation is naturally diverse, through the 5 parishes analysed, according to the central functions concerned, but Nossa Sra. Anunciada (clearly, in the centre of an autonomous town) and, at other level, the more (sub)urbanized ones (Aqualva and Vialonga) seem to stand out, for more specialized functions. On the other hand, services play a fundamental role in the structuring of the economic productive basis and in giving consistence to the productive systems. Concerning this issue, there are a multiplicity of mechanisms through which services can enhance the territorial vitality, including the incorporation of knowledge and economic value in the local productive systems, the supply of additional competitive factors for a particular territory, the part played by the existence of proximity services, or the way they can fuel the seizing of endogenous resources or particular institutional resources. Here, the results are more diffuse, concerning the different processes involved, and some services are in certain cases particularly important in the support to a specific productive specialization (e.g, agro-industrial activities on Poceirão and Sarilhos Grandes, tourism in NS Anunciada, logistics in Vialonga, etc.), and on the other cases important for its diversity in the structuring of “urban” ambience and economic urban life (e.g, Aqualva, or, particularly, N.S. Anunciada). Still in economic terms, services can be also seen as important in the other dimensions used to assess sustainability, more occasionally, for example, in support of wealth and welfare, through the informal economy (e.g Sarilhos Grandes case with the informal trade of clam or other banned shellfish).

Considering the assessment that was made in terms of social sustainability, the relevance of services can also be evidenced. Among the five dimensions which were used for the assessment of sustainability in this field, just some of them are particularly interesting to understand the importance of services, and thus we will centre mostly on those components: equity; well-being and quality of life; and identity and sense of place. In the case of equity, the relation with services is immediate. The existence and quality of provision of services in the diverse fields analysed (e.g, housing, education, health, security, mobility,...) is a fundamental aspect in the access that people have to these components of their lives (and of territorial development), be it based on public or private provision. The results reflect clearly the territorial density aspect, with lower scores in the less “urban” parishes (Poceirão and Sarilhos Grandes). Regarding the issue of well-being and quality of life, services are fundamental for the social satisfaction they provide in these fields. The perception of quality of life in the area of residence by the subjects takes this aspect clearly in account, and the existence of amenities provided by these services is clearly valued in the survey, though very diversely between parishes, accordingly to the diverse aspects which are much valorised, in the residential choices, in each space. Finally, what concerns to identity and sense of place, the importance of services is also indirectly expressed, particularly on the type of anchorage (relational, functional, spatial) that can be inferred from the survey’s results. The importance of functional related aspects, particularly (but also the relevance of other aspects, like the ones linked to nature, environment, or culture, where services can play a particular role), is a sign of the importance of the existence of a variety of services (very diverse from parish to parish, and, also and even mostly, within the territory of each parish) to the construction of identity(ies) and to the development of the sense of place. But even in the others dimensions used for the assessment of social sustainability the importance of services can be seen, more sporadically, such as in the case of the role of (cultural, sportive, political, environmental) associations to the empowerment of populations and enhancement of participation, which is an important feature for social cohesion, for instance.

4.3. A typology proposal for understanding services in metropolitan periurban territories

With these examples in mind, and the notion that we are facing five very different parishes, that are representing five distinct typologies of periurban territories which will have, naturally, their specificities, we can try to extract some regularity and propose a typology which enables us to bring some systematization to this analysis. In effect, despite all this diversity and the natural particularities of each situation, there are some common factors which allow us to try to establish a grid for evidencing the importance (and specificity) of the different types of services in these territories and the challenges services have (and bring) to periurban territories.

Service activities (as well manufacture or agriculture, for instance) are irremediably an artificial and unsatisfying categorization for apprehending the complexity of the contemporary production-consumption chains, and the knowledge incorporation in

good-service continuums (cf. Ferrão, 1992), which incorporate progressively more intangible contents in material goods. Besides, the services label has proven to be a conceptual umbrella for many diverse and highly heterogeneous activities, which are very dissimilar in their economic characteristics (e.g. knowledge incorporation mechanisms, qualifications involved, productivity gains, growth rates) locational structures and geographical dynamics. As Glückler and Hammer (2011) point out, this diversity is usually studied in one of two different ways: or by micro approaches usually conducting case studies within selected service branches in order to reveal the particularities of these activities; or by macro approaches attempting to capture the diversity of services by classifying services into homogenous statistical categories of similar attributes. In spite of the multiple developments on the research and application on service taxonomies, scholars and policy makers still lack pragmatic tools to capture and monitor the importance of these activities on the development of local and regional economies. The profusion of service typologies, often based on idiosyncratic definitions and sometimes incomparable classifications of service sectors (both in academic world and in policy-making and statistic administrations) do not solve this problem. We will not contribute to that here, certainly. But we will try to contribute with a proposal that enable us, and other researchers, to deal with another layer of complexity in all these on-going discussions: the spatial differentiation within the urban-metropolitan spaces, namely considering the specificities of periurban territories.

Glückler and Hammer (2011), drawing upon several precedent debates, suggested what they called a multi-dimensional taxonomic framework meant to deliver a useful differentiation of service types in the economy (a “pragmatic service typology”), which have supported their (quantitative) empirical analysis in several German regions. They have based on three main divides that have been often used to distinguish the diverse types of services: (i) the demand orientation (consumer services vs business services); (ii) the knowledge-intensity (operational services vs knowledge-based services); and the technology intensity (checked by the degree of technology using). With this basis, they operationalized the use of the following 5 analytical categories:

- OCS – operational consumer services
- KICS - knowledge-intensive consumer services
- OBS - operational business services
- KIBS - knowledge-intensive business services
- TKIBS - technological KIBS

It is not our aim, in the scope of this work, to proceed to an extensive statistical approach to this issue as the one made by the authors, as we are well aware of all the problems with it, some of them identified by the own authors, and our purpose is distinct. Our specific interest is in the comprehension of intra metropolitan spatiality of these activities, and specifically, to understand their importance for periurban territories and for that it is essential a more qualitative approach, based on more detailed information.

In that sense, after the analysis developed in LMA and in the five parishes we have studied, we suggest to cross this typology with another 3 axis, which we found structuring for the intra-metropolitan geographical distribution of these activities (and their importance for the affirmation of the respective productive structure):

- a) Locally oriented / externally oriented (related with the demand internal or external to the metropolitan/urban space), dividing the locational aspects, particularly on business services.
- b) Degree of specialization (related to the hinterland of the respective central function), with spatial differential impacts both on knowledge-intensive and operational services, and both on consumer and business services, but selectively attracted by periurban territories.
- c) Collective / individual services (regardless of the public/private provision) (considering the weight of amenities, and particular the service provision of collective goods, with impact mostly on operational and knowledge intensive consumer services).

Not all of them are discriminant to other classifications (e.g, is not so relevant if the KIBS are private or public, for their territorial implementation), so after clearing up, the typology suggested is the one presented in figure 6, which presents also a schematic classification of the relative importance of each kind of services in urban, periurban and rural territories. ,

Figure 6: Typology of services and urban/periurban/rural territories

		Urban	Periurban	Rural
Ind OCS	Individual operational consumer services	+++	++	+
Col OCS	Collective operational consumer services	++	++	++
Ind KICS	Individual knowledge-intensive consumer services	+++	++	
Col KICS	Collective knowledge-intensive consumer services	+++	++	
L OBS	Local-oriented operational business services	+++	+++	++
E OBS	External-oriented operational business services	++/(+++)	+++	
L KIBS	Local-oriented knowledge-intensive business services	+++	++/(+++)	+
E KIBS	External-oriented knowledge-intensive business services	+++	(+++)	
TKIBS	Technological KIBS	+++	(+++)	
S OBS	Specialized operational business services	++	(+++)	(++)
S KIBS	Specialized knowledge-intensive business services	+++	(+++)	(+)

Legend: + to +++ represents intensity degree, readably in line; (+) represents eventually, in specific cases

Source: own elaboration

This tentative typology intends to be a contribution to the discussion. We are aware of the simplifications and limitations of this kind of exercise, but it aims to be a first step to the disentangling of the importance of the diverse kinds of services to the diverse components of metropolitan spaces, and particularly to the identification of the periurban specificities. Certainly other crossings could be presented on the figure 6 and several oversimplifications were made in this brief exercise. It can be further developed and tested in other contexts. For now, we just would like to highlight that this tensions between geographic concentration and dispersion, intra metropolitan space, must also be seen at the light of the specific preferences of particular parts of populations (and economic activities) for specific kinds of amenities, as well as, especially, at the light of specific territorial assets (e.g. tourist or cultural points of interest, natural resources,...), that will be, in each specific situation stronger than several other factors, in the development of certain activities or the provision of (more specialised or banal) services, as we've seen several examples in LMA, particularly when external markets are at stake.

5. Concluding note

This paper aimed to discuss the role of services in the "in-between" territories that periurban metropolitan spaces are. They have a specific importance in the spatial economic structuring of these areas and in the quality of life and well-being these areas provide, and that was shown, drawing upon the results of an empirical work developed in five different parishes of Lisbon Metropolitan area, which represent themselves five distinct categories of periurban territories.

From this analysis it was possible to observe that these territories are able to explore some special advantages of locating between the centre and the margins, attracting residents and economic activity with those competitive assets, and contributing actively to the territorial restructuring of an area that is restructuring itself fastly at economic, demographic, social and cultural terms. We can assume the existence of a peri-urban socioeconomic specific situation, characterized by a diversification of activities and social practices, but also by a diversity of territorial dynamics, which appeals to different forms of intervention regarding nowadays and future challenges of metropolitan areas, including naturally the specific challenges of periurban areas. The typology of services which was suggested is a first contribute to the continuation of this discussion, extrapolating for other realities than LMA.

This should take seriously in terms of policy making and spatial planning, as well in the realm of regional development policies. On one hand periurban territory has specificities that should not be ignored not diluted amidst the challenges metropolitan territories are facing, on its whole, in contemporaneity; on the hand, there are different types of periurban, as shown by our research, which need to be revealed and assumed by policy makers and planners in their decisions. The perception of this diversity may be an important instrument to support a more coherent and realistic decision-making process regarding the enhancement of the sustainability of a territory whose evolutionary pathways are strongly conditioned by planning, governance mechanisms, and territorially management policies, as well as by general driving forces of change in-between local and global processes.

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Annex A - Economic Sustainability – Evaluation Framework

Dimensions	Sub Dimensions/indicators	Source
a) Capability of economic polarization / attractiveness	1. Capacity / performance level of relevant core functions	Visual Methods
		Secondary Information (INE+CCDR)
		Interview
	2. Capability of attracting residents	Secondary Information (INE)
		Secondary Information (INE)
	3. Attractiveness of economic activity / investment	Interview
	4. Mobilization capacity as a tourist destination (and 2 nd residences)	Interview
		Secondary Information (INE)
		Secondary Information (Municipalities)
b) Consistency of the production structure/Consistency of the specialization base E.g. Specialized production and degree of economic diversity	1. Structuring level of row-cluster-sector / knowledge creation and value	Interview
		Secondary information Ministry of Economy and Employment
		Secondary Information (INE)
		Visual Methods
	2. Structure of resources and competitive factors (natural, institutional, human capital, etc.); presence of innovation and knowledge	Interview
		Secondary Information (Municipalities)
		Secondary Information (INE)
		Secondary Information (Municipalities)
		Visual Methods
	3. Role of local services	Interview
		Secondary Information (Municipalities) + Visual Methods
	4. Mobilization level of specific / endogenous territorial resources - (self-sufficiency) externally - sustainable	Interview + Visual Methods
	5. Main actors and level of institutional articulation	Interview
c) Living Standards, Consumption and Wellbeing	1. Income and wealth levels	Interview Interview
	2. Consumption / practices	Visual Methods
		Interview
	3. Employability	Secondary information (INE, Employment Centers)
		Interview
	4. Informal income-generating mechanisms and consumption capacity (e.g. self-production , informal exploration of natural resources, etc ...)	Interview
D) Degree of Trust, Uncertainty and Expectations	1. Evolution of Expectations Individual perception of situational aspects that influence economic activity e.g. investment decisions, (un) employment, ...	Interview
	2. Degree of trust / Business Opportunity (Entrepreneurship) (Evaluating the current crisis and its impacts; funding capability)	Interview

Annex B - Social Sustainability – Evaluation Framework

	Sub dimension	Indicator	Source
a) Equity	1. Housing	1.1. Weight of housing costs in the family budget	Survey
	2. Education	1.2. Perception of ease access to housing	Survey
		2.1 Perception of ease access to educational facilities of various levels	Survey
		2.2. Time spent on going to educational establishments	Survey
	3. Health	2.3. Education levels coverage	Secondary information (INE)
		2.4. Educational equipment evaluation	Survey
		2.5. Coverage of disciplinary fields within the secondary education	Secondary information (INE)
	4. Security	3.1. Coverage - number of public equipment and valences in health	Survey
		3.2. Public valences in health	Secondary information (Municipalities, parishes)
	5. Mobility	3.3 Perception of easy access to health	Survey
		4.1. Have safety and / or Civil protection with diversity of skills	Secondary information (Municipalities, Parishes)
		4.2. Security Perception (scales)	Survey
	6. Employment	5.1. Public transport network coverage	Secondary information (Municipalities, Parishes)
		5.2. Cost of commuting in the family budget (or cost of major travel (work / school / other)	Survey
	7. Income	5.3. Mobility evaluation	Survey
		6.1. % Of people registered in the employment center	Secondary Information (Employment Center Data)
		7.1 Income intervals: Gini index calculation or distribution by income quartiles (unit of analysis-the family)	Survey

b)Cohesion	1. Social cohesion scale	1.1 Cohesion Scale	Survey
		1.2 Expert perception of social cohesion degree	Visual Methods
	2. Social capital	2.1. Local sociability: type (friendship, cordiality, mutual help)	Survey
		2.2. Perception of conflict	Survey
		3.1. Number of associations, clubs, collectives	Secondary information (Municipalities, Parishes)
	3. Empowerment and Participation	3.2 Participation and interest in intervening in parish related matters: participation in associations, local initiatives; local project initiatives	Survey
		3.3 Types of involvement	Survey
		3.4. Perception of the relationship with local administration (easiness of exposing a subject / solve a problem / degree of access to information)	Survey
		3.5 Perception of associative and civic life	Survey
	4. Values / Confidence	4.1 degree of trust in others and in institutions	Survey
			Survey
		4.2 perception of homogeneity in values	Survey
		4.3. Heterogeneity and degree of tolerance	Survey
C) Social Diversity	1. Social composition: coexistence of different socioeconomic groups and families	1.1. Weight of foreign residents	Secondary information (INE)
		1.2. Structure of qualifications	Secondary information (INE)
		1.3. Structure of professions	Secondary information (INE)
		1.4. Diversification of family structure	Secondary information (INE)
	2. Possibility of social tissue renewal	2.1. Weight of new residents in the population	Secondary information (INE)
		2.2 Change in the demographic structure	Secondary information (INE)
		2.3 Evolution by weight of more qualified people.	Secondary information (INE)

	3. Perception of social composition and attitude towards coexistence (tolerance to others) 4. Perception of social composition evolution and appreciation of this evolution	2.4. Evolution in the weight of most valued professionals.	Secondary information (INE)
		3.1. Perception of social diversity degree	Survey
		3.2 Expert perception of the degree of social diversity	Visual Methods
		4.1. Sense of evolution: homogeneity or heterogeneity	Survey
d) Well-being and quality of life	1. Evaluation of life quality in the residence area	1.1 evaluation of various aspects of the residence area	Survey
			Survey
		1.2. Evaluation of quality of life in the residence area	Survey
		1.3. Evolution of life quality in the residence area in the last 10 years	Survey
		1.4. Perspective of change to improve quality of life	Survey
		1.5. Evaluation of the relation between personal quality of life and local quality of life	Survey
e) Identity and Sense of Place	1. Sense of belonging local / community	1.1. Degree of identity / local attachment	Survey
		1.2. Expert perception of the "attachment" degree to the local / identity	Visual Methods
	2. Type of anchorage (relational, functional, spatial)	2.1. Types of identity • Features that give identity to the territory • Type of identity / anchorage with the place of residence 8 dimensions of identity: Environmental Quality; Biodiversity, environment; History and Culture; Social Networks; Genealogy; Functional; Connection to place; homogeneity	Survey

D4: Knowledge intensive services: geographic characteristics and development

Chair Patrick Ström

International Financial Centre Development in Central and Eastern Europe – Role of Financial & Business Services Offshoring in IFC Formation

Zoltán Gál¹

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Abstract

This paper examines the development of international financial centres (IFC) in Central and Eastern Europe (CEE). The study argues that the development of the financial services in CEE is characterized by external dependency, which is manifested in the form of hierarchical command and control functions over CEE financial subsidiaries within the West European IFC network. The paper quantitatively compares the factors of IFC functions of Budapest in comparison to those of Warsaw and Prague. It argues that despite the lack of market evidence showing signs of a regional-centre focus during the transition period, there are some signs of IFC formation. The paper assesses the uneven impact of the global economic crisis upon CEE financial centres and confirms that their development trajectories became more differentiated as a result of the crisis. The steady decline of Budapest during the second half of the 2000s was accompanied by the rise of Warsaw. Our analysis concluded that Budapest, despite its earlier endeavours, most likely lost the competition to become an international financial centre.

Key words: international financial centres, Central and Eastern Europe, post-socialist transformation, FDI, IFC functions, crisis

Introduction

Global financial capital has played an important role in all transition economies. Foreign direct investment in the banking sector is closely connected to the transition process in Central and Eastern Europe (CEE) and has received considerable attention from both a theoretical and an empirical perspective. However, much less attention has been devoted to the major determinants of international financial centre (IFC) formation within the “de-nationalised dual banking system” of CEE (Gál, 2014).

During the last three decades the financial services industry has experienced major transformations in which the largest market players, institutions, and global hubs, namely IFCs, have gained importance. Although market activity is spreading to new corners of the world, a powerful process of centralization is reinforcing the traditional dominance of financial capitals, led by London and New York, and to a lesser extent by second and third tier international financial centres (Faulconbridge et al. 2007, Engelen and Grote 2009, Gál 2010). Despite the growing body of literature (Grote, 2008, Engelen, 2007; Grote, 2008, Wójcik, 2007, Engelen,

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2007, Boschma and Ledder, 2010, Zademach and Musil, 2012) on the development of global financial centres, very little attention has been paid to the evolution of financial centres in peripheral or emerging regions (Poon et al. 2003, Kareman- van der Knaap, 2009, Zhao et al. 2013)

Despite the geographic dispersal of financial services, the increased importance of central coordination and control functions is the main characteristics of IFCs. A financial centre is defined as a large city with an agglomeration of the headquarters of the largest financial firms providing all banking and financial services, nationally or internationally (Porteous 1999, Cassis 2010). The term is used for strategic urban locations where the financial sector plays a dominant role in the local and/or global economy, as measured by the share of financial services in national income, GDP, or in total employment, and by the presence of foreign banks. Apparently, financial sector agglomeration reflects and reinforces 'real economy' concentrations, as firms tend to agglomerate similarly to other advanced producer service providers in order to achieve the location advantages of urbanization economies (Porteous, 1999). Financial centres can be classified, in terms of their geographic influence, as national, regional (international functions with macro-regional scope), and global centres (Zhao et al. 2004). A global centre is defined as a city with a strong presence of a wide variety of financial players (investors, brokers, securities firms, investment banks, etc.) with extensive international activities, while the domestic centre is dominated by firms with a domestic scope of operations.

These international financial centres, which are also referred to as global cities, have developed a dense network of linkages, and provide a full-spectrum of advanced producer services. Most of the major international financial centres are also world cities (Sassen, 2004, Taylor, 2004). These global centres have massive concentration of resources that allow them to maximize the benefits of information and connectivity, with other centres generating asymmetric power relations executed through their affiliates, which are the key mediators of their command and control functions. Key social and information-generating processes occurring in IFCs, such as face-to-face contact, are facilitated by a high degree of social proximity. IFCs are also a gateway for financial services for other lower tier centres. The emergence of IFCs depends on several factors, among which the most important are: (1) the size of the domestic economy, (2) the information hinterland, and (3) path dependence (Cassis 2011). Scale economies, together with the diversity of the financial sector, are a key factor explaining the formation of a financial centre. The concept of an information hinterland defines a geographical area for which the financial centre provides an ideal access point for the exploitation of valuable information flows. The path dependence approach refers to a historical incidence that would have long-run cumulative consequences in the evolution of financial centres (David, 1988). The development trajectories of the Central and Eastern European financial centres, as well as the impact of the economic crisis, are likely to differ from those of higher-rank international financial centres.

Central and Eastern European financial centres are neglected from this point of view, and Kareman's (2009) or Wójcik's (2007) studies on contemporary financial geographies of Eastern Europe do not provide a detailed overview of the development of financial centers, and do not consider the development of IFCs' functions in the region. Despite its re-integration processes into the global financial markets, little attention has been directed towards the development of financial centres in Central and Eastern Europe. This paper examines the financial centre function of Budapest in comparison to those of Warsaw and Prague, two other significant financial centres in the contemporary CEE region, and how they are integrated into the network of established European financial centres. As the development of the financial sector in

European emerging markets is largely dependent on foreign investments, explicit attention is directed to determine which CEE centres exhibit sufficient power to attract multinational financial service firms and develop certain international functions. The paper examines whether the concentration of command and control functions over CEE within the Western European IFC network make it possible to develop parallel IFC function in CEE capital cities.

The paper explores the international financial centre function of Budapest relative to Warsaw and Prague, assessing the preconditions (including the main indicators of banking & capital markets) for the creation of a regional centre. It presents the requirements for the formation of an IFC and discusses arguments about the ongoing competition among the CEE metropolises. The paper also raises the question of whether the CEECs need to develop their own regional financial centres, or whether they could instead rely on existing 'western' IFCs. This study also examines the impact of the recent global economic crisis on the future of Central and Eastern European financial centres. This raises the question of cross-border financial exposures and the related risks of financial contagion, as well as of asymmetric shifts in capital flows between West European and CEE financial centres during the crisis.

From the methodological point of view, both qualitative and quantitative data have been collected. Primary data is collected from national statistical offices, central banks, and private financial firms' reports (Raiffeisen CEE Banking Reports), as well as from the websites of international financial organizations (e.g. Bank of International Settlements, World Federation of Exchanges). We also used consultancy firms' reports. With regard to the development of the financial centre functions of Budapest, expert interviews were conducted with the stakeholders of the Hungarian banking sector and policy makers in 2007.

The paper is organised as follows: the first section summarises the impact of transformation on IFC formation. The second section examines the development of the international financial centre function of Budapest, as compared to Warsaw and Prague, assessing the preconditions for the creation of a regional centre transition using quantitative indicators. The third section assesses the impact of the global crisis on Central and Eastern European financial centres. Finally, in the concluding section, key findings are summarised.

Impact of transition on the formation of International Financial Centres

Since the early 1990s CEE countries went through fundamental political, economic, and institutional transitions on the way from a centrally planned economic model to an open market economy. Structural adjustments were accompanied by the rapid internationalization and re-integration of CEE countries into the global economy, and later – by European integration and accession into the European Union.

Most of the literature studying the transition process has described the transformation and the (re)-integration of the region into the global capitalist system as a linear convergence with the advanced market economies, following the path of liberalization and privatization. However, there is considerable diversity among Central and Eastern European countries, due to their different legacies, varieties of implemented transformation models, and economic policies

(Sokol, 2001).² The crisis further strengthened these different developmental trends, resulting in diverging economies and regions within Central and Eastern Europe.

Concerning IFC formations there were three parallel processes, namely the *post-socialist transition*, *financialization*, and *world-city formation*, which not only accompanied but also influenced the conditions of the development of financial centers explored in this study.

The post-socialist transition was characterised by external pressure from the intertwined virtues of neoliberalism, foreign capital, and international institutions (e.g. IMF). The international situation in the context of which the change of regime was to take place in CEE was crucially shaped by two major currents of the twentieth century, namely, *globalisation* and (*neoliberal*) *economic paradigm change*. These developments not only contributed to the fall of the Soviet bloc, they also created rather strict economic conditions for post-communist countries about to reintegrate into the global market economy. In the course of this transition, CEE countries had to adjust to the *modus operandi* of a world economy fraught by shocks and uncertainties (debt crisis, money market and currency crises), driven by competition, which could sometimes be extremely disadvantageous. The forerunners of economic transition, like Hungary, were exceptionally vulnerable and had to act as an experimental ground for the dominant interests of foreign capital (Gazsó-Laki 2004). According to Gowan's (1995) view, the transition, and especially the 'shock therapy' approach, was designed to allow Western capital to conquer the Eastern European markets, to capture cheap production lines and create dependent West-East economic relations. As a result, the chief characteristics of this blend of "*outer directed capitalism*" or the 'dependent market economy' model (DME) included a relatively fast recovery from the transformation crisis but also a dominant role of foreign capital in the process of stabilisation. (Szelényi et al 2000).

Although there is no single indicator of international integration, the transition process is heavily influenced by dependence on foreign financial inflows, and generally by the high level of *financialization* (Myant and Drahokupil, 2012). Foreign Direct Investment (FDI) inflow into CEE economies has been a vital factor in the first stage of privatisation, and FDI became the predominant type of incoming capital investment in the first stage of the economic transition. The banking and insurance sectors were the primary targets of strategic foreign investors, resulting in significant inflows of FDI into these sectors, connected mainly to the privatisation of state-owned banks. The other forms of foreign capital inflows were also important in many countries of the CEE region. Indebted states (Hungary, Balticum) inherited or generated larger debts, and due to their 'fiscal alcoholism,' they remained dependent on foreign investors in public debt financing. Other forms of private flows, such as equity investment, increased as the local blue chip companies started to attract more foreign capital through revitalised local stock exchanges. The most important form of financialization was driven by an increase in domestic consumption credit.

² Martin (2001) puts the CEE transition into the context of the centre-periphery model and divides the regions by different subregions: 'super-periphery A' (ECE and Baltic states) have a more solid economic structure, legacy of modernization, and more experience with market and political democracy. In 'Super-periphery B' (former Soviet Union) countries, liberal-capitalist economic and political structures were relatively underdeveloped.

The *network of world cities* was another determining factor for the formation of IFCs in the 1990s. The rapid integration of economies through the structural effects of globalisation on production, financial transactions, and wealth creation have also stimulated the *formation of world cities* (Lo and Yeung 1998). This is also accompanied by an unprecedented concentration of new tertiary and quaternary activities, such as various forms of financial and advanced producer services (Bourdeu-Lapage and Huriot 2003, 2005). It is therefore not accidental that the Globalization and World City Network's approach ranked world cities on the basis of the concentration of advanced producer services (Taylor, 2004). The process of globalization, defined as increasing the cross-border integration of economic activities, is enhancing interlinkages and interdependencies among major cities located around the globe. The process of the formation of world cities impinges upon the transformation of the structural and functional role of these cities, focusing on the role of command and control activities (Sassen, 2004).

In this regard, pressures of globalization, particularly in the form of city competition for attracting investments and improving their position within international urban networks, have posed significant challenges for the transforming capital cities of CEE countries. The capital cities of the most dynamically reforming states of Poland, Hungary, and the Czech Republic were the most exposed to globalization and EU integration, and have been playing a leading role in their transforming economies.

The transformation and modernization of capital cities were characterised by two simultaneous processes. *First, metropolitan transformation* has led to important structural changes in Central and Eastern Europe, characterised by economic restructuring, and by the shift from industrial to service economy. *Second, the international integration* of the capitals of the Visegrád Group³ into the global world-city networks has played a key role in the formation of IFCs. These cities started to internationalise their financial and business functions beginning in the early 1990s, while simultaneously searching for investors and a particular 'niche' in which to specialise in trans-national (European) and cross-border (regional) urban networks. Simultaneously, capital cities became gateway cities by attracting a significant number of western corporations, who placed their regional headquarters responsible for business operations in the entire CEE region there. The position of Budapest, Prague, and Warsaw was enhanced from the rank of cities of national significance to cities of European importance (Enyedi 1998, Csomós 2011).

Economic transition has been most beneficial for capital cities. It means that the overwhelming part of GDP is produced in the capital city-regions (in Hungary - 48%, in Slovakia - 60%). In the period 1995–2009, capital city-regions in CEE countries grew more rapidly than other regions and cities of the European Union (Gál-Lux 2014). In fact, after two decades of city transformations, there is considerable rivalry and competition among CEE cities for access to resources, investments, and networks, which could diminish the overall competitive strength and cohesiveness of an enlarged European Union. If we take a closer look at the financial functions of competing capital cities and examine them in the context of financial market transitions, we can clearly see the emergence of winners and losers.

Development of functions of national and international financial centres in Central and Eastern Europe – the rise and fall of Budapest

³ Czech Republic, Hungary, Poland, Slovakia.

Revival of financial centre functions during the transition period

Transitions of the financial markets and changes in the urban fabric of national financial centres in CEE are seen as both path-dependent and path-shaping process, where history and the legacies of earlier modernization processes (catching-ups) in the region matter, but new trajectories are also possible (Sokol, 2001).

In the early 1990s, after 40 years of discontinuity during the communist period, Hungary's financial sector reintegrated into a global financial system that was shaped by powerful processes of globalization. A common characteristic of the spatial organization of the Hungarian banking system before and after the political transitions in the 1990s was an extremely high concentration of headquarters function in the capital city. This peculiarity could be explained by the mode of revival of the modern Hungarian banking system. A specificity of banking systems in transition economies is that financial markets did not emerge organically. With the separation of central banking and commercial banking functions in 1987, a two-tier system was established from above and was supervised by a central authority. At the same time financial resources were mainly concentrated in the capital cities as a legacy of the centrally managed state economy. Its main command and control functions were already strongly centralised in capital cities, like Budapest. In this sense, the new system practically reproduced the earlier Budapest-centred, over-centralised state-socialist mono-bank structure, even if more financial institutions were founded. Early privatisation dominated by foreign banks and EU regulations further reinforced these functions of financial centre.

As the centre of the national economy, Budapest is also the country's financial centre. International relations in the financial sector are administered via the capital city. All institutions and functions associated with these roles are located there. Budapest has the only stock exchange in the country. It concentrates the head offices of banks, insurance companies, specialised credit institutions, building societies, mortgage banks, and lease companies. The significance of the capital's special strategic geographical location in the national financial system also derives from the fact that important, so-called "critical information" (i.e. making bank strategies, central data provision, access to the giro-system) flows exclusively via the centre. Institutions for maintaining contact with other IFCs are also to be found there. The number of financial sector employees in Budapest is equal to 40 thousand, which is 56% of the total country's workforce in this sector (2013).

Financial centres located at the top of the urban hierarchy concentrate the greatest amounts of capital. This results in significant regional disparities (Porteous 1995, Leyshon-Thrift 1997). In the case of Hungary, this means that 94% of banking capital stock is concentrated in Budapest. Since banks available for privatisation were exclusively located in Budapest, as were greenfield banking investments, in effect 100% of foreign capital invested in the sector was concentrated in the city. The common feature of CEE transition economies is the scarcity of locally founded banks.

Role of the foreign capital in the formation of financial centres and asymmetric power relations

Dependent market economies⁴ of Central and Eastern Europe are heavy importers of capital, therefore the ratio of inward and outward FDI stock is much higher than in the EU-15, due to

⁴ See: Nölke and Vliegenthart, 2009, Raviv, 2008.

the low level of capital exports from these countries (Nölke and Vliegenthart, 2009). Foreign financial inflows and especially FDI have resulted in dramatic changes of ownership structures. In 1994, in the wake of the early transition crises, an overwhelming majority of the banks in post-communist countries were still state-owned. There was a double shift of ownership from the public to private sector and at the same time from domestic to foreign owners through privatisation. In contrast, in 2007 private foreign ownership already accounted for about 80% of banks' assets in the CEE region.⁵ Hungarian financial markets, similarly to other CEE counterparts, remained rather bank-centered, and security markets played only a limited role. The only exception in the region is the revival of the Warsaw securities market since the mid-2000s (Mykhnenko, 2007, Wójcik, 2007).

At the beginning of the 1990s, the Hungarian banking system – similarly to its Eastern and Central European counterparts – faced the problem of reintegration into international markets, while also witnessing the swift spread of foreign capital, which was to play a leading role in accelerating modernisation and privatisation. Unlike in the Czech Republic, where voucher-based mass privatization was followed by a relatively belated recapitalization and foreignization of the banking sector, or in Poland, where not only a belated banking reform but also a gradual and well-regulated privatization made much more room for the state and privately owned domestic banks, the rapid “de-nationalisation” and foreignization of the Hungarian banking system was unique in the region in the beginning of the transition period.⁶ It created a peculiar ownership structure, differing from the majority of developed countries as well, in which *the share of foreign-owned banks* reached around 75% by 2000 (Gál, 2005). Foreign financial inflows have resulted in dramatic changes of ownership structures throughout the region. In 1994, in the wake of the early transition crises, an overwhelming majority of financial intermediaries in the post-communist countries were still publicly owned. By contrast, in 2007, more than a decade later, private foreign ownership already accounted for about 80% of financial intermediaries' assets in the CEE region.⁷

Traditional “modernization theory” highlights the key role of foreign banks in institutional development, stability, and the increase of financial depth of the banking sectors, and emphasizes that FDI increased the host country's integration into the global economy (Wachtel 1997, Várhegyi 2002, Csaba 2011). If we try to place the CEE region in the comparative typologies of capitalism following Nölke and Vliegenthart's (2009) argument, the primary source of investment in the CEE is foreign direct investment, not the stock market as in Liberal Market Economies (LME), or domestic credit as in Coordinated Market Economies (CME). Although FDI does play a role in the other capitalist models, the degree of external dependency is much more extreme in the CEE (Raviv, 2008). Foreign banks (understandably) followed commercial market-seeking principles, and even the governments of host countries were not active in gearing or “diverting” them through various regulations towards addressing

⁵ These figures are especially striking when we compare them with the average level for the EU-25, where the share of foreign-owned banking assets in total is less than one quarter. In the Euro area this figure is equal to 15.5%. Even the average for non-OECD countries is 50% (Gál, 2014).

⁶ This rapid privatization of the banking sector can be explained by bankruptcies and the regulation of the supervision of the banking sector as well as *bank and credit consolidation* with significant state participation (its cost was equal 14% of the GDP by 1999).

the development needs of their economies. “Rather, they were always aimed at redressing the declining profitability of financial institutions operating in the already financialised economies of Western Europe. As a result, foreign financiers emerged as a powerful rentier class in Central Europe able to extract rent incomes far in excess of their profits in the west” (Raviv, 2008. p.311).

DMEs are characterised by an unequal power relation between the home countries and the CEECs through parent-subsidiary networks of TNCs. ‘Dual banking system’ model, characterized by the dominance of foreign-owned commercial banks, became common in these economies (Alessandrini, and Zazzaro, 1999, Gál, 2005). Dual-economies literature argues that FDI generates typical core-periphery disparities between old and new Member States. That model, consisting of large foreign banks and small local/indigenous banks, displays strong dependence on foreign banks and their resources (external liabilities vs. local savings). Financial TNCs in the primary international financial centres have a massive concentration of resources that allow them to maximise the benefits of information and connectivity with other centres. Inter-linkages that are established between their subsidiaries and their parent bank generate asymmetric power relations executed through their affiliates (Kareman, 2008; Wójcik, 2007, Gál 2010). These power relations mediate strong command and control functions over CEE countries within the international financial centre network from which these investments are controlled. Asymmetric power relations also play a significant role in the international financial centre function of Budapest, Warsaw, and Prague, and provide certain unfavourable preconditions.

As Central and Eastern European countries are largely dependent on foreign investors in finance, explicit attention is directed at determining which CEE financial centres attract multinational financial firms, and Kareman (2008) examined from which international financial centres these investments are controlled. The banking sector in the CEE region is predominantly commanded from the financial hubs of the neighbouring ‘old’ EU Member States.⁸

Factors of the formation of Budapest’s IFC in comparison with its CEE counterparts

This section quantitatively examines the development of international financial centre function of Budapest, as compared to Warsaw and Prague, assessing the preconditions for the creation of an IFC. It also tries to find market evidence showing some signs of IFC formation, with a particular regional focus in the three cities.

As we noted before, the capital cities of Central and Eastern Europe became major gateways for FDI investments, and headquarters of TNCs’ subsidiaries expansion towards new markets. Early GaWC⁹ research (Beaversock et al., 1999) reflects the increasing economic significance of these capital cities in CEE, and as a consequence they became an agglomeration of advance business services. On the basis of the agglomeration of banking, accountancy, legal, and advertising services firms, capital cities of CEE have shown their visibility in the third level group of gamma world-cities, in line with other secondary European services centres (Hamburg,

⁸ Vienna, Stockholm, and Athens, among others, became gateways to the East and hosted the headquarters of large investors in the CEE, Baltics, and Southeastern Europe, respectively. The largest concentration of parent-subsidiary connections forms bridgehead centres (Moscow, Warsaw, Budapest) in the CEE.

⁹ Globalization and World City Network

Munich, Berlin, Cologne) (Csomós 2011). Prague, Warsaw, and Budapest were major centres in at least one category of high-order services. According to Taylor (2004), who examined the global network connectivity of banking firms, Warsaw ranked 9th in Europe, followed by Prague (17th) and Budapest (19th).¹⁰

Csomós (2011) compared these capital cities on the basis of their economic strength measured by GDP (PPS). In 2008, Warsaw, with 68Bn USD, ranked 85th (followed by Hamburg), Budapest with 53 Bn USD was 100th and Prague was the 106th. Functions of coordination and control can be measured by the number of corporate headquarters of domestic companies located in these capitals.¹¹ Multinational companies and banks prefer to hierarchically control local subsidiaries from the headquarters of their parent banks located in the IFCs outside the CEE region (Myant & Drahokoupil 2010). From the emerging international financial centre functions point of view, headquarters of locally based multinational companies matter more as they concentrate their own control functions in Central and Eastern European IFCs (Gál, 2014).¹²

The next section summarises the factors of IFC functions through analysis of the selected indicators in the three capital cities (Budapest, Prague, Warsaw). Various data, such as employment figures, presence of foreign banks, depth of financial sector, and the size of stock markets, illustrate the main factors of the development of international financial centre functions.

Employment in financial services

Employment in the financial sector has the highest share (10.6%) in Warsaw, demonstrating the growing importance of financial centre functions (Table 1). The relative weight of its financial sector corresponds with the share of the leading global IFCs. Contrary to Warsaw, Budapest shows the lowest relative weight of this sector, which also demonstrates higher volatility and very slow growth during the entire transition period.

Table 1
Share of Financial sector in total employment of the capital cities (%)

% of total employment	BUDAPEST			WARSAW			PRAGUE		
	1995	2002	2013	1995	2001	2013	1995	2001	2013
Financial Intermediation (K)	3.5	3.8	4.3	6.0	7.8	10.6	3.2	4.9	6.3

¹⁰ Warsaw was the 25th most connected IFC worldwide according to the banking network connectivity in 2003.

¹¹ According to the Forbes Global 2000 database, in 2010 the world's 135th largest HQ city in CEE is Budapest, with 26 Bn USD aggregate turnover of the companies located there. Budapest is followed by Warsaw, which is only ranked 227th, and Prague with 238th place (with 11 and 10Bn USD turnover respectively). It has to be noted that while both Hungary and the Czech Republic are represented by single capital cities with a very high geographical concentration of HQ function, Poland is represented by three additional cities (Plock, Gdansk, and Lublin).

¹² Budapest is a peculiar IFC in this sense, as it is the only centre that developed its own control functions due to the fact that the only Eastern European regionally based multinational bank (outside Russia and to some extent Slovenia), the OTP Bank, has its headquarters in Budapest.

The relative importance of the financial sector in the three cities is evaluated by calculating location quotients (LQ).¹³ According to the domestic LQ, Warsaw's financial sector dominance within the Polish economy is clearly marked by its almost five-folds (4.4) share in comparison to the share of that sector in nationwide employment (Table 2). In the case of Budapest the same ratio (2.0) rather indicates a stagnation, while Prague managed to increase the importance of its financial sector within the domestic economy. The intercity LQ compares the weight of finance of each city with the average structure of all three capital cities. While Budapest's position negatively deviates from the average, Warsaw's share significantly exceeds it, demonstrating the successful adaptation of the Polish capital to the requirements of the global economy, and the common tendency towards metropolization marked by the increasing weight of its financial sector.

Table 2

Domestic (Dom LQ) and Inter-city (IC LQ) Location quotients of capital cities on the basis of employment in the financial intermediation sector (2001)

NACE 1 rev. 1	Average employment in 3 cities %	BUDAPEST		PRAGUE		WARSZAWA	
		IC LQ	Dom LQ	IC LQ	Dom LQ	IC LQ	Dom LQ
K (2001)	5.5	0.8	1.9	1.0	2.4	1.2	2.6
K (2013)	7.0	0,6	2.0	0.9	3.3	1.5	4.4

¹ Intercity LQ (IC LQ)

² Domestic LQ (Dom LQ)

Source: Bourdieu-Lapage, 2003, author's calculation based on data of Central statistical offices.

Size of banking sector within the economy

Banking assets of eight new Central and Eastern European Member States (who joined in 2004) was only a small fraction of the EU as a whole, 1.2% of the total EU-25 assets in 2005, and so only a small segment of the European banking market.¹⁴ The Hungarian banking system was

¹³ For the financial sector, the domestic LQ is the ratio of the share of that sector in the city employment to the share of that sector in the nationwide employment. It relates the city structure to the country structure, so identical city structures generate different domestic LQ values depending on the country structures. The intercity LQ is the ratio of the share of that sector in the city employment to the average share of that sector in the five capital cities. This LQ is independent of the country structures. It permits direct comparisons between the employment structures of the three cities.

¹⁴ This was equal to the size of the Portuguese banking system or the assets of the Royal Bank of Scotland (in 2003), and almost three times smaller than the size of Deutsche Bank. The average bank size in this market was about 1.3 billion Euros.

the smallest of the three countries, only slightly more than one-third of the Polish banking system (50 billion Euros).

(Table 3). *Overview of banking sector developments, 2005-2013*

	Czech Republic		Hungary		Poland	
%	2005	2013	2005	2013	2005	2013
Bank assets (Bn EUR)	100	(159)* 190	78	(124)* 105	164	(274)* 339
Bank assets/financial assets, %	81.1	68.8	86.2	76.6	84.8	70.0
Share of foreign banks (% of total asstes)	94.5	83	84.5	67*	69.9	62
Banking assets/GDP	101.0	135	90.1	108.0	62.4	86.2
Loans to private sector/GDP	17.6	22.5	26.0	23.2	16.5	17.0
Loans to househods/GDP	12.7	28.4	17.2	23.7	31.0	37.0
Total deposit/GDP	62.7	86.7	39.3	43.1	32.9	47.5
Loans in foreign currency (% of total loans)	13	18	38.6	51	26.2	30.0
Loan-to-deposit, %	63.7	75.0	113	110	78.8	108.0
ROA (return on asstes)	1.4	1.4	2.2	0.5	1.6	1.1

Source: cenral banks, CEE banking reports, Raiffessen Bank

*data for 2009.

Financial markets in the region remained rather bank-centred as a consequence of slowly developing capital markets (Mykhnenko 2007). The share of banks in the financial sector assets is still around 70%. The depth of banking, measured by assets per GDP, was the highest in the Czech Republic (101 and 135% respectively) and the lowest in Poland (62.4 and 86%). Hungary with its figures ranked in the middle (Table 3). As for the banking sector, when measured by operational efficiency and profit indicators the Hungarian banking system proved to be the most at the beginning and the least efficient at the end of our research period.

Operational efficiency of the banking sector has improved significantly in the region after a relatively short transition crisis. However, prior to the recent 2008 crisis, banking sectors in CEE had become a major target of credit-fuelled growth. Foreign banks played a significant role in the transmission of contagion to transition economies.

Presence of foreign banks

The spatial concentration of foreign banks is an important indicator of the global integration of the financial center of the region. However, the clear indicator of a thriving international financial center is the increasing presence of private investment banks. As the economies recovered from the transition crisis and the EU expansion was completed, foreign investment banks such as Goldman Sachs, J. P. Morgan Chase, and Credit Suisse set up their offices in each of three analysed capitals. The presence of the 15 largest investment banks was examined in 2005 (Gál 2010). Despite the relatively low level of overall presence at that time, Warsaw proved to be the most attractive location, where seven investment banks had their representation, while only four such offices were opened in Budapest (Table 4). A relatively

large and crisis-resilient Polish economy attracted more investment banks than all their counterparts put together. In 2011 Goldman Sachs opened its Warsaw investment banking office, considering Warsaw as an important financial hub with huge development potential for the whole region (Hashimoto, 2015).

Table 4

Offices of 15 largest private investment banks in three CEE capital cities, 2005

	Warsaw	Prague	Budapest
J.P. Morgan	X	X	-
Merill Lynch	X	-	-
Morgan Stanley	-	-	-
Goldman Sachs	-	-	-
Deutsche Bank	X	X	X
Citibank	X	X	X
Bank of New York	-	-	-
Barclays	-	-	-
State Street	-	X	-
UBS	X	X	-
Nomura	-	-	X
Credit Suisse FB	X	-	-
Shroeders	-	-	-
Lehman Brothers	-	-	-
HSBC	X	X	X
Brown Brothers Harriman	-	-	-
Total	7 (2)	6 (1)	4 (1)

(1) Bank office is exclusively located in only one out of the three cities.

Source: Gál, 2010

Cross-border flows in the financial sector

Cross border financial flows and their direction (inflows-outflows, capital import-export) are one of the major indicators of the international integration of IFCs.¹⁵ During the first phase of transition, FDI was the most important source of cross-border capital flows in CEECs, although, with varied timing, mainly because of the different privatisation timetables in different countries in the pre-crisis era (Fig. 1). Data shows that Hungary lost its attractiveness even before the financial crisis. In terms of the stock of FDI in the sector, Poland stood out in 2007,

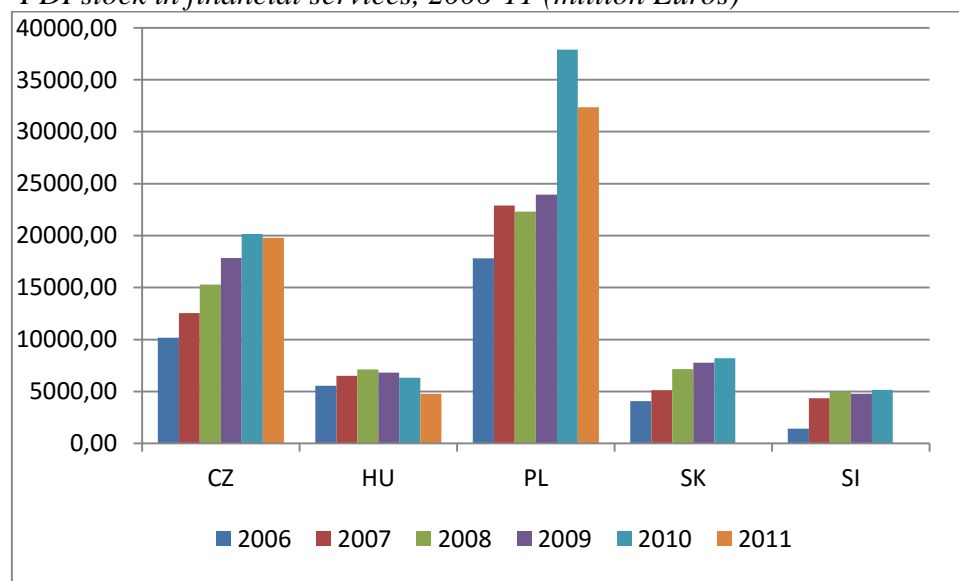
¹⁵ Although the data available on country level, due to the dominant role of financial centres these flows are controlled and intermediated by financial institutions/subsidiaries located in the host IFCs.

with more than 20 billion Euros foreign investment demonstrating its greater potential to attract new strategic investments in the Polish financial sector. Changes in FDI flows during the crisis period were substantial. While there was a smaller fall of FDI in the Czech Republic and a larger one in Poland in 2009, FDI stock in financial services was mainly characterised by growth, while in Hungary this indicator slightly decreased during the crisis (Gál and Sass, 2013).

There are significant cross-border transactions channelled through the networks of the West European parent banks and their local subsidiaries. About 50-70% of corporate lending and 60% of interbank lending in 2009 was the subject of cross-border transactions, which not only has an implication for increasing international integration of CEE financial markets by strengthening connectivity to the European IFCs, but also, these links generated imbalances in the banking system during the time of the crisis, as the CEE remained largely reliant on cross-border lending. Hungary experienced higher cross-border lending, which is expected on the basis of economic fundamentals, and the fact that it had developed significant vulnerabilities in the pre-crisis period. This resulted in the largest drop in cross-border lending (unlike Poland, which almost managed to maintain its international position, and the Czech Republic, where demand for cross-border lending remained low). Cross-border bank flows demonstrate that Poland has leading position of attracting banking flows, while Hungary shows larger fluctuation in this sense (Table 5).

Fig. 1

FDI stock in financial services, 2006-11 (million Euros)



Source: National banks

Another parallel process, namely the rapid surge in outward foreign direct investment (OFDI) generated by the cross-border activities of locally-based multinational banks, made Hungarian companies prominent foreign investors in the wider Eastern European region. Financial capital export to Eastern and Central Europe is dominated by bank acquisitions of OTP, the largest bank of Hungary, and OTP become the only “indigenous” multinational bank in the region (by

2008, 40% of assets, 66% of branches, and the 38% of total loans of OTP bank were generated abroad)¹⁶ (Gál, 2014).

Table 5

External positions (cross-border claims) of BIS¹⁷ reporting banks vis-a-vis CEE countries, 1996-2013

	1996 Bn US	2004 Bn USD	2008 Bn USD	2013 Bn USD
Hungary	1,4	39,8	95.0	43.2
Poland	7,2	40,9	138.0	120.6
Czech Republic	7,2	17,3	54.0	51.2

Source: BIS Annual Reports

Size of the capital markets

Studies focused on global cities draw attention to the fact that the dominant feature of these leading cities is the considerable concentration of financial capital, not only in banking but also in stock markets. Data on total market capitalisation and the number of companies listed on stock exchanges, therefore, serves as an ideal index for measuring financial centre development. It has to be noted that stock exchanges in the CEE countries have taken a fairly short period of time to reach their recent potential. There are no large companies in the region with longer stock market experience and none of the institutional investors has long history of presence in the region. All CEE stock exchanges were launched as late as the early 1990s, after the change of the political and economic regime. Budapest Stock Exchange was founded in 1990. As the fast economic uplift in the countries of the Visegrad Group was substantially driven by FDI, the contribution of domestic companies to the GDP of the national economy remained rather small. As it is primarily domestic companies that are listed at the regional stock exchanges, it is not surprising that the value for domestic market capitalization is low (Csomós, 2011) (Table 6). The market capitalization of the new EU Member States accounted for only 2% of market capitalization of the EU in 2004. The aggregated size of the Warsaw (WSE), Prague (PSE) and Budapest (BSE) Stock Exchanges was equal to only 13% of capitalization of the Deutsche Börse at a time. Due to the relatively strong banking sector and the non-organic development of capital markets in the region, firms were allowed to seek affordable bank loans rather than to endeavour to attract investments through less mature stock exchanges. In addition, the propensity of households to raise funds in the capital market is still low.

¹⁶ OTP Group currently operates in Bulgaria, Croatia, Romania, Serbia, Slovakia, Ukraine (CJSC OTP Bank), Russia, and Montenegro via its subsidiaries. Until 2004, 28% of Hungary's FDI export was generated in the banking sector.

¹⁷ Bank of International Settlements (BIS), Basel

Table 6

Key indicators for the stock exchanges of Central and Eastern Europe in 1999-2013

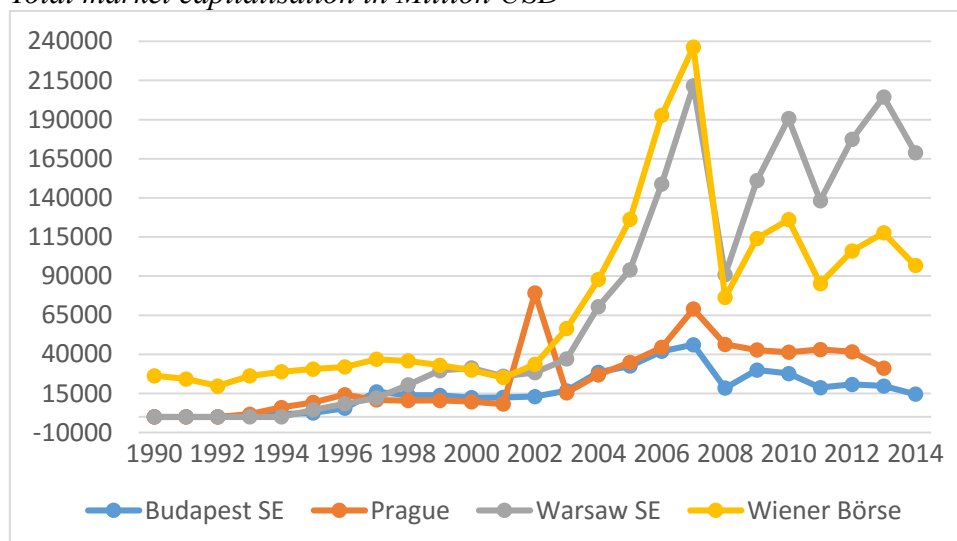
	Market capitalization				Number of listed companies							
	1999	2005	2009	2013	1999		2005		2009		2013	
	Million USD				Domestic	Foreign	Domestic	Foreign	Domestic	Foreign	Domestic	Foreign
Budapest SE	13 811	32 575	30 037	19 797	64	2	44	0	42	4	50	0
Prague SE	10 582	34 886	75 022	31 260	74	0	23	4	18	8	13*	10*
Warsaw SE	29 577	94 028	150 962	117 541	221	0	234	7	470	16	869	26
Wiener Börse	33 023	126 251	114 076	204 677	97	14	92	19	97	18	82	20

Source: World Federation of Exchanges, Annual reports and statistics,

*2014

Figure 2

Total market capitalisation in Million USD



Source: Edited by the author, World Federation of Exchanges, Annual Reports and Statistics,

Despite its slow start, the Warsaw stock exchange rapidly increased its capitalization from the early 2000s and attracted more companies for listing than did neighbouring stock exchanges (Budapest, Prague, Vienna). The effect of financial crisis was visible in both 2008 and 2011, although Warsaw seemed to recover faster than the other financial centres. The development of the stock market in Budapest, once a forerunner in the region, has been rather weak, with the current level of market capitalisation being comparable to the pre-EU accession period level, despite a steady increase of GDP (Figure 2). The number of companies listed in Warsaw in 2013 doubled since 2009 and reached 895, out of which 26 are foreign. This level is significantly higher than that of Vienna - 102 companies, 20 foreign; Prague (23 with 10 foreign) in Prague, and Budapest (50, none foreign) (Federation of European Securities Exchanges, 2015) (Table 6). By the mid-2000s, the Warsaw Stock Exchange, due to its larger

capitalisation, posed serious competition to the Budapest Stock Exchange. The Warsaw Stock Exchange became the leading stock exchange of the region, and that is why the Wiener Börse intends to compete with it by acquiring control over the smaller stock exchanges in the CEE region. The rearrangement of the ownership structure of these stock exchanges suggests that Vienna and Warsaw are strengthening their leadership roles in the CEE region, while the roles of Budapest and Prague are diminishing (Csomós 2011). As far as foreign listing is concerned, Budapest no longer seems to be a strong international capital market centre.¹⁸

Assesment of the function of Budapest international financial centre

The stake of the ongoing race among metropolises in Eastern and Central Europe at the beginning of the 2000s was in part whether Budapest, with the relatively most developed financial markets at that time, could become a regional business and financial centre of Central and Eastern Europe (Enyedi 1992). Nevertheless, contradicting former optimistic expectations, Budapest has not yet become such a regional financial and business (gateway) centre, the envisaged “Singapore of Central Europe.”¹⁹ Rather, as a result of the crisis and the recent unorthodox economic policy, Budapest seems to have exited from the regional competition of international financial centres located in the region (Szabadföldi 2001, Gál 2010). At the same time, the Hungarian capital did have the potential to acquire competitive advantages in certain areas of the financial sector in the early 2000s. Such advantages could stem from its central location, early economic reforms and its bridging role within the region. Budapest’s only peculiar role as an international financial centre is strengthened by the fact that due to its housing the OTP Bank’s headquarters, it is the only financial centre in the region which developed its own command and control functions over subsidiaries located abroad (Gál, 2010b). OTP’s expansion abroad since the beginning of the 2000s increased the connectivity of Budapest as a regional financial centre. However, the regional banking networks alone do not make a city an international financial centre – especially when capital markets are concerned.

In other respects, however, Budapest is not unique in comparison to other regional capitals (Prague, Warsaw), which are rapidly catching up – they had compatible, and even larger domestic markets. Another reason for this is the overlapping foreign ownership. Foreign banks established subsidiary banks with parallel networks controlled by managements of foreign parents rather than by selecting a single regional financial centre. Therefore there is little evidence of regionalisation in the banking markets of Central Europe.

However, already during the 2000s there were serious impediments to Budapest’s becoming an international financial centre. Its previous competitive advantage in the financial sector and capital-attracting potential gradually decreased due to the deteriorating macro-economic position of the country prior to the crisis. The competitive advantage of Budapest was also weakened by the organizational transformations of the BSE in 2004. This allowed the Wiener Börse, following a policy of expansion in the framework of takeovers, to acquire majority

¹⁸ In 2011, Poland’s stock market ranked fourth in the amount of capital raised. At the WSE, 38 new companies were listed in 2011, and 25 of these were foreign ones.

¹⁹ In the period of dynamic growth in Hungary the first Orban government had made attempts to develop Budapest as CEE regional business and financial centre. See: <http://www.bibca.net/en/home>

shares in the Hungarian and Czech stock exchanges. Budapest's position concerning its independent decision-making functions was adversely affected by the acquisition of the Vienna Stock Exchange.²⁰

In Budapest, despite a suitable supply of highly qualified professionals, qualifications of the available workforce still fall short of international quality standards. In an interview, the CEO of a US-owned bank emphasised that in certain areas of finance (accounting, cost-management, marketing and sales), there are especially serious shortcomings in labour supply. Consequently, financial services providers tend to employ foreign managers.

In a 2007 interview with a banking analyst, the issue of functions of regional IFC was discussed. The interviewee argued that there was a genuine niche for creating a regional sub-centre in Budapest and for providing certain special back office services for the global financial firms. Although the capital city would remain primarily a national financial centre while extending its lower level international embeddedness in shared services and business process outsourcing. The question is whether these shared services locations attracting new types of FDI might help in repositioning weakening business and financial centre functions.²¹

Although earlier consultancy reports revealed strong international business presence (regional headquarters, advanced service providers, IT, accounting and HR) to be a necessary factor for developing international business and financial centre functions in Budapest, surveys also demonstrated the lack of leadership both within Budapest as well as in the CEE region (Szabadföldi, 2002, Gál 2010). The plan to compete against Warsaw and Prague as the regional business centre was introduced in 2001. This plan seemed to have correctly identified Budapest's comparative advantages vis-a-vis 'western' cities (e.g. Vienna), but it was short on explaining the vision for distinctive features of Budapest vis-a-vis Prague and Warsaw as financial centres. Nevertheless, it should be noted that the rise and fall of Budapest as a prominent regional financial centre could be explained to a large extent by the actions and successes achieved by other financial centres.

Possible role of financial & business services offshoring in IFC formation.

The rapid surge of globalisation, opening up of formerly isolated regions such as Eastern Europe, Russia and China to global trade, has substantially boosted task trade and service related cross-border investments. Many Central and Eastern European countries invigorated by EU enlargement became important locations for offshored service centres. Building on the region's nearshoring advantages such as geographical-cultural proximity and on its multilingual graduate supply, CEE is likely to utilise more value added and quality-driven services investments. Relocation of service offshoring-related activities, such as outputs, value added, employment, foreign direct investments and exports in services have grown rapidly, particularly

20 Since the Wiener Börse has acquired control over the Budapest stock exchange, a series of debates arose between the Austrian management and the handful of domestic blue chip companies (OTP, MOL, Richter) in strategical issues, which hinders the development of a long-term strategic vision for the BSE.

21 EU accession, competitive infrastructure, low wages, and a strong education system were favourable preconditions that supported the growth of the first group of capital cities, such as Prague, Budapest, and Warsaw, in the first wave of the offshoring boom of the late 1990s (however, it is notable that advantages in rival capitals are similar and mostly based on low wage cost) (Gál-Sass, 2009, Gál, 2014).

after 2000, especially in the new EU member states (NMS) of the region (Czech Republic, Hungary, Poland and Slovakia though “latecomers” such as Romania and Bulgaria have also begun to act as host for this type of investment) (Gál-Sass, 2009). This section discusses the additional location factors selecting Central and Eastern European city-locations. The question is here whether these shared services locations attracting new types of FDI might help in repositioning weakening business and financial centre functions.

Offshoring can have benefits for the host market and generates changes within the service sector as a whole, and in particular has an impact on their locations and on the urban network. What is the most likely impact of services offshoring on the home economies? GDP growth of nations largely depends on service innovation. Offshoring is a major driver of shift towards services in FDI. This gains a particular importance in the CEE countries after their EU accession as it helped to mitigate the fear of TNCs’ outmigration in manufacturing and it substituted the decreasing share in manufacturing FDI by service investments. Offshoring enables the host countries to shift to higher value services (Sass, 2008, Micek et al. 2011).

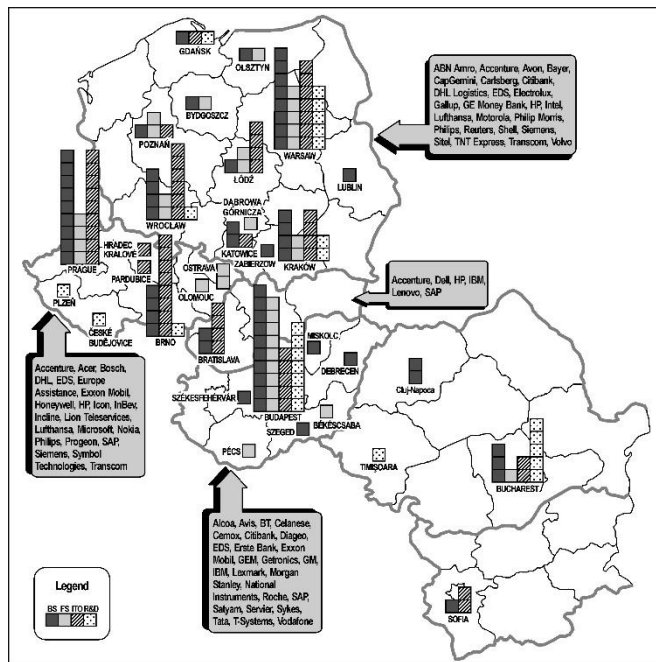
Besides the general home market effect the process of selecting and opening new locations is similarly important as offshoring has a strong impact on the cities selected. As far as the geographical distribution of the investments in business services is concerned, there is a strong spatial concentration in all the analysed countries. Capital cities are the main hosts to business services companies, and sometimes secondary centres emerged (Cracow, Brno). It is understandable, that demand-led horizontal investments locate in the capital city where there is the highest demand for their services. For supply-driven vertical investments, the main attracting factor in capital cities is the large supply of suitable workers (Hardy et al 2011).

The metropolitan transformation accompanied by both the rapid deindustrialisation and expansion of services has resulted in the concentration of the high-level business and financial services into the capital cities (Lux, 2010). Simultaneously interactions and symbiotic competition emerged between the capital cities, as they have been competing for attracting investments. EU accession, competitive infrastructure costs and strong education system as favourable preconditions supported the first group of capital cities, such as Prague, Budapest and Warsaw in the first wave of the offshoring boom from the late 1990s (Gál, 2014) (see Figure 5). These cities were the most successful to reposition themselves during the early stages of transition by exploiting their comparative advantages on global market place. At the beginning costs (labour cost, real estate prices and facilities) were the most important driver in selecting these location mostly for routine offshoring activities. However, these capitals have relatively higher wages. Nevertheless, cost differential with Western Europe are still significant, making these cities still attractive for higher value added nearshore service activities.

The first wave of cities in the offshoring boom, including the first tier capital cities such as Warsaw, Prague and Budapest are saturating in terms of skilled labour and offices supply, to the point that raises the opportunity for the second tier cities to find alternative locations in the midsize provincial cities and to tap their unexploited talent pool has become an increasingly important operational consideration (see Fig. 5).

Figure 5

Geographical and sectoral breakdown of the major services offshoring sites in Central and Eastern Europe, 2010



Legend: BS=business services; FS= financial services; ITO= Information Technology Outsourcing; R&D=Research and development, Knowledge process outsourcing; One box is equal with one offshoring site.

Source: drawn by the author based on data of PAIiZ, Czehinvest and ITD-Hungary.

Poland, with the largest potential supply of skilled labour and the availability of untapped provincial locations has developed the most extensive network of offshoring locations. The spatial concentration is more pronounced in Hungary and Slovakia where the capital cities, which are the main locations of this type of investments, represent a higher share of the total population than in Poland and Czech Republic.

However, Hungary once a forerunner in the establishment of shared service centres opening its first location in 1999 has lost its leading position. Contrary to Poland, most of the projects have concentrated into the capital city of Budapest and governmental agency failed to channel most of new investments towards the midsize cities. While BPO investment has been selected by the Polish and Czech agencies as a priority, the Hungarian agency however received criticism concerning its marketing activity. As in other spheres of economic activity in Hungary Budapest dominates the BPO and ITO sectors. Hungary has no suitable office markets in its midsize cities. More Vendors maintain operations in both the capital city and secondary cities in Hungary. Budapest is leveraged for higher-value work, while lower level processing is accomplished in secondary locations that offer much lower costs and extremely lower attrition sites.

Contrary to IFC locations, shared services centres (SSC) are less embedded in their national and regional hinterlands, and these supply and efficiency-driven²² vertical investments across national boundaries are seeking low-cost global locations within *transnational production systems*. The demand-led market seeking investments (such as financial FDI) were the most

²² The demand-led horizontal investments are located in the capital city, where there is the highest demand for their services. For supply and efficiency driven vertical investments, the main attracting factor in capital cities is the large supply of suitable and relatively cheap skilled workers (Hardy et al 2011).

common throughout the beginning of the transition period in CEE (Hardy et al. 2011). Due to their low level of territorial embeddedness, SSCs' impact on their host location is rather limited. Consequently, SSC locations can not result in a natural evolution to an IFC, as it lacks the geographical concentration of indigenous and international financial firms and the exercise of command and control functions from their headquarters (*Bellon 1998, Pelly 2001*).

Impact of 2008 global economic crisis on CEE financial centres

The transition of the financial sector in the CEE region has received considerable attention during the transition from both a theoretical and an empirical perspective (Bonin et al. 1998, Wachtel 1998, Claessens et al. 2001, Gál, 2004, Várhegyi 2002, Banai et al. 2010, Csaba 2011), but much less attention has been devoted to the post-transition period and the impact of the crisis, which has become the most serious challenge of transition models, and has indirectly affected the IFC conditions of the capital cities.

Concerning the transmission of the crisis in CEE, there are two distinct approaches in the transition literature. According to Myant and Drahokupil (2012), the financial crisis was an external shock to the CEE region and affected countries in different ways, where financial inflows and export flows were the transmission channels of the contagion. The other arguments emphasize that the crisis cannot simply be understood as an internal adjustment to an external shock (Bohle, 2010); rather, the global financial and economic crisis exposed the weaknesses of the post-socialist neo-liberal economic development model in CEE (EBRD Transition Report, 2009). Smith and Swain (2010) focus on the dependent models and uneven forms of transition to capitalism and the internationalization of the financial sector in CEE. They argue that this model of transition has contributed to systemic vulnerabilities exacerbated by the crisis in the CEE region.

In a few CEE countries, catching up in the first half of the 2000s was generally accompanied by macroeconomic stability (Czech Republic, Slovakia, and partially Poland), but certain countries (Hungary, Estonia, Latvia) of the region became increasingly vulnerable to external shocks due to unsustainable trajectories of credit-fuelled housing and consumption booms, high current-account deficits, and quickly rising external debt (a large proportion of it denominated in foreign currencies). Foreign currency indebtedness channelled through interlinkages occurring between West European parent banks and their local subsidiaries had an implication for the internal and external imbalance within the EU banking system (Gorzelać and Goh 2010). The impact of the crisis has been highly uneven within the European Union and has not only increased the gap between the core countries and the peripheries, but also resulted in growing diversity within CEE.²³ Poland has avoided recession by not having expanded huge debt and by benefiting from its large internal markets (Smith and Swain, 2010). The excessive burden of debt repayment resulted in severe decline both in investments and consumption. This was the case in some of the countries that experienced negative or zero growth in 2008 and 2009 (Latvia, Hungary, Romania).

²³ Hungary's external funding exposure was the highest (while the Czech Republic had the lowest), reaching one third of total liabilities in 2009.

In Hungary, foreign currency indebtedness had direct spillover effects on the national economy since 2009, when local debt crisis affected all indebted sectors (Gál, 2014). The impact of the financial crisis increased Hungary's dependence on external financing and also weakened the position of Budapest as an international financial centre. In Hungary and the Baltic states, funding availability and capital outflows led to a more severe decline in bank lending than the Eurozone average (measured by loans to the nonfinancial corporate sector).²⁴ The crisis has also altered the future growth prospects of these CEE countries; monetary and fiscal policies are on a tightening course for several years and there is little room for powerful countercyclical policy responses. External capital inflows suddenly and significantly stopped despite the relatively quick recovery in the region. For example, in Hungary, despite its recovery, the scale of investment and the financial intermediation sector remained much below its pre-crisis level.

The financial and economic crisis has had an impact on the international financial centre position of the capital cities studied. Various data on banking and capital markets (lending activity, market capitalisation) illustrates the fluctuation in the concentration of IFC functions. After the ambitious start of Budapest thanks to the seemingly successful gradual transition model, it is now losing the race with other CEE capitals to become the international financial centre in the CEE region.

The rapid decline of Prague as a financial centre in the late 1990s and Budapest in the second half of 2000s was accompanied by not only a less spectacular recovery, but also by the rise of *Warsaw*, especially after the 2008 financial crisis. Despite the fact that the recent financial crisis had a visible effect on Warsaw in 2008 and 2011, it recovered faster than other financial centres in the region. In this regard there are two effects in play – the country effect and the financial center effect. Poland was not only able to avoid the recession, but well-timed regulations managed to prevent the burst of the housing bubble. Foreign capital inflow was not significantly affected. Warsaw experienced a tremendous scale of public and private investments, and the large domestic market generated huge demand. Poland does not rely heavily on export (it accounted for only 40% of GDP, half of the percentage of the Czech Republic and Slovakia). The EU funds also contributed to the mitigation of the effects of the crisis (Berend, 2013).

Besides its crisis resilience, there are important factors that make *Warsaw* suitable for the functions of IFC with a strong regional focus. For instance, the high-standard of financial regulations in the Polish financial market in general, and the wise and active strategy that made the Warsaw Stock Exchange the largest player in the CEE region. This strategy is accompanied by active marketing, and by an active engagement in multilateral trading platform, which helped link the WSE with London (Wójcik 2007, Hashimoto 2015). Warsaw was the only city of the three that managed to attract many foreign investors and influential market players, even during the time of the crisis. With its global presence, the WSE successfully maintained its independence from Vienna, unlike its larger regional counterparts (Budapest, Prague).

²⁴ The current FDI literature (Claessens and van Horen 2012) focusing on the impact of foreign bank presence on credit creation and financial stability during the crisis confronts the once-dominant approach of “supporting effect” of foreign banks (Haas and Lelyveld 2009).

The financial and economic crisis have had a moderate impact on *Prague's* banking sector as the banking market was prudent, and the share of foreign currency loans, which proved to be the Central and Eastern European subprime, was insignificant. The Czech Republic experienced “reverse flows” because of the decrease in cross-border lending in spite of its strong economic fundamentals. However, the indirect effect of the crisis became clearly visible in declining demand, largest pressure on profit, efficiency and risk management. The strong presence of German and Austrian retail banks in the Czech Republic and the incorporation of the Prague Stock Exchange into the Wiener Börse was accompanied by an integration trend in the capital markets as well. However, the PSE did not recovered from the financial crisis, as the total market capitalisation in Prague was only a half of its 2007 value.

Similarly to Prague, the development of financial markets in *Budapest* has been rather weak, reflecting the deteriorating macroeconomic situation, which started long before the crisis and was characterised by the lack of strategic-minded long-term economic policies in Hungary. Starting in the late 1980s, Hungary was a pioneer country for transition success, but its badly designed and managed fiscal and monetary policies have served poorly in preparing it for the global economic crisis in 2008. Despite sustained rapid development continuing up to 2006, imbalances and negative trends have gained ground since the beginning of 2000s. Paradoxically, its financial integration, once the engine of transition and growth, became the source of relatively large accumulated private and public debt, and contributed to the crisis. Hungary's public debt, although below the EU average level, had increased rapidly, from 54% in 2000 to 80% of the GDP in 2010. The foreign currency indebtedness of the private sector resulted in the largest risk for macroeconomic imbalances.

Although the Hungarian ‘gradual’ transition model is characterized by some degree of stability, at the same time, foreign investment and takeovers seem to have strengthened the fundamentals in Budapest. However, the lack of consistent and long-term economic policies and the fiscal alcoholism of serving governments and weaknesses of regulations made the Hungarian financial markets unstable during the crisis, and further weakened Budapest's international financial centre position. The recent right-wing government's campaign against foreign-owned banks in Budapest presented big challenges to Budapest's ambition to become an international financial centre. On the one hand, foreign capital inflow has stabilised the Hungarian economy and even developed it to the highest level in the region by 2004. On the other hand, the the Hungarian banking system's over-reliance on foreign capital made the risks of high reverse capital flow evident during the recent financial crisis, demonstrating the dependency of Budapest on the West European IFCs (Mihaljek 2010).

The capital inflows to the financial sector have recovered somewhat since the outbreak of the crisis in 2008, and stock has increased substantially in the Czech Republic and Poland, while decreasing in Hungary. The seemingly successful stabilization programme in Hungary could not take advantage of counter-cyclical measures until recently, due to the huge burden of public and private indebtedness (the transfer of foreign currency debt to local currency that was decided upon in late 2014 could cost 8% of the GDP). The right-wing government launched a major re-nationalization program after 2010, primarily in the energy and banking sectors. It aims to increase the domestic/state share of the banking sector, which reached more than 50% by 2015 at the expense of purchased foreign owned subsidiaries. The Hungarian government heavily taxed foreign-owned banks in past years, and therefore the Hungarian financial market is considered less attractive for foreign financial players. The nationalist approach strongly

discourages the internationalisation of Budapest as a financial centre and as it looks now, it has left the competition to become the international financial centre of CEE region.

Conclusions

The aim of the present study was to examine the development of international financial centre function of Budapest as compared to Warsaw and Prague during the transition period, assessing the preconditions for the creation of regional centres. Various data used, such as employment figures, presence of foreign banks, and size of the banking sector and capital markets, illustrate the signs of financial centre formation. However, despite the significant growth in financial sector employment, banking assets, stock market capitalization, and cross-border capital flows since the early 1990s, the size of the financial sector and the number of global players concentrating in these capital cities are still much smaller than their western counterparts.

The paper finds that despite the increasing integration of these capital cities to the network of the West European IFCs, the external dependency of these capitals, which appears in the form of hierarchical command and control functions by global IFCs, reinforces the high level of financial dependence of CEE. This prevents the development of fully-fledged financial centre functions. A key finding of our study is that despite these preconditions, carefully tailored economic policies combined with city branding strategy make it possible to develop certain IFC functions in each of the three capital cities, providing significant benefits through international economic integration and networks, as illustrated by Warsaw's example, or by the post-crisis development of Budapest as a counter-example.

The paper argues that the global crisis not only exposed the weaknesses of the post-socialist development model in certain CEE countries, but it has also had a significant impact on the future development of IFCs. Our analysis confirms that diversification is observable not only at the country level, but on the level of capital cities as well, as their development path also became more differentiated as a result of the crisis. Various data on banking and capital markets illustrates the fluctuation in the concentration of IFC functions. Despite there being little market evidence showing signs of a regional-centre focus there around the millennium, recently there are more signs of IFC formation, especially considering the current development of Warsaw. Budapest, once a forerunner in economic transition, lost its previous competitive advantage in the financial sector and declined due to the deteriorating macro-economic conditions and mismanaged economic policies long before the crisis. Budapest has not become a regional financial centre despite its favorable preconditions, which largely stemmed from the regional network of OTP Bank. The paper argues that regional banking networks alone do not make a city an international financial centre – especially when capital markets are concerned. However, in the case of Warsaw, its prudent and investor-friendly economic policy, high-standard of financial regulations, and active strategy in the capital markets, made the city the most important IFC in CEE. With its global presence, the Warsaw Stock Exchange not only maintained its independence from Vienna, but also became the largest exchange in the region.

The rise and fall of Budapest as a prominent regional financial centre can be explained not only by the badly managed fiscal and monetary policies prior to the global economic crisis, but also to a large extent by the competition and successes of the other financial centres. We argue that besides the lack of consistent economic policies and weaknesses of regulations that made the Hungarian financial markets vulnerable during the crisis, the recent nationalist approaches of the government (re-nationalization, levy on banking) have further weakened Budapest's international position. Our analysis concluded that Budapest, despite its earlier endeavours, has most likely lost the competition to become an international financial centre.

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XXV. International RESER Conference

Outward FDI in financial services: the case of Hungary

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This work-in-progress document contains results of a research analysing outward FDI in financial services from Hungary between 2001 and 2014. We identified the main foreign investor companies, of which one is a Hungarian-controlled, majority foreign-owned bank and a local subsidiary of a German bank. The paper examines in detail the foreign investment activities of the leading investors and changes in it during the crisis. The methodology applied is detailed case studies of the main investor banks, based on semi-structured interviews with leading managers as well as other information collected from specialised newspapers and journals and the bank balance sheets. On the basis of these, Hungarian OFDI in financial services is analysed, regarding the main ownership advantages of investors, their motivations to invest, the entry mode chosen, the geographic locations of the investments, the strategy settings of the companies and the home country impact of outward FDI.

1. Introduction

Outward foreign direct investments (OFDI) increased substantially from former transition economies after the start of the transition process. Hungary was among the frontrunners in OFDI in this country group, starting to invest abroad considerable amounts from the mid-nineties. (Kalotay, 2002; Antalóczy and Éltető, 2002) At the end of 2012, the stock of Hungarian OFDI amounted to more than 26.5 billion euros, which is the second largest behind Poland among the new member states of the European Union. In per capita terms, only Estonia and Slovenia have higher OFDI than Hungary in the same country group.

Hungarian OFDI is concentrated in a few sectors, partly in connection with the largest transactions connected to a few companies. (Sass, Kalotay, 2010) Thus it is highly concentrated in terms of the investing companies. According to the data of the Hungarian national bank, the outstanding sectors are mining, in manufacturing: oil, pharmaceuticals and electronics and in services: financial services, professional and other services (mainly business services). Thus the high concentration in terms of the investors is connected with the sectoral composition of OFDI. The leading sectors are: financial services (20% of total OFDI, with OTP Bank as the most important outward investor), mining and quarrying and manufacturing of refined petroleum products (18%, connected to the activities of MOL) and pharmaceutical industry (6%, mainly Richter). OFDI in financial services has represented a significant part of modern Hungarian OFDI (Gál, 2006; Antalóczy and Sass, 2008; Sass, Kalotay, 2010; Sass et al., 2011), though its absolute values had been relatively small: it surpassed

the half a billion euro stock only in 2000, but afterwards it grew dynamically to exceed a stock of 3 billion euros by the end of 2009. At the end of 2009, it represented 23.5 % of total Hungarian OFDI, being the leading services sector in terms of OFDI. By the end of 2012, the OFDI stock in financial services increased to more than 5 billion euros, a significant increase from previous year. (Direct comparison with developments before 2008 is not possible because of the change in methodology in sectoral data collection.)

Similarly to total OFDI, financial OFDI is highly concentrated in terms of the number of significant investors (Gál, 2010): according to our estimation, OTP represents the overwhelming majority of investments abroad in the sector, while a small share (an estimated 100-200 million euros) was taken up by MKB until 2014, thus 2012 data contained the foreign investment of this bank.¹ The third investor is also small, the formerly OTP-related OTP Garancia, operating in investment services may be responsible for the majority of OFDI in that sector, amounting to a stock of 26 million euros in 2009. OTP Garancia was acquired in 2008 from OTP by the French Groupama and thus this company inherited an office in Slovakia.

Table 1 Outward FDI (stock) in Financial activities, 1998-2009 (million euros)

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Monetary activities	57.7	67.6	48.3	86.7	127.9	182.1	295.2	1600.9	2075.7	1702.7	1991.3	2158.0
Other financial activities	249.0	326.8	529.8	583.3	565.0	835.6	775.1	442.7	518.4	163.5	616.7	886.3
Insurance	0.4	0.3	0.3	-	6.1	13.3	17.4	12.0	20.3	86.6	25.6	26.9
Total	307.0	396.6	605.4	670.7	731.0	1056.6	1087.8	2080.7	2614.8	1996.9	2650.1	3086.7

Note: equity, reinvested earnings and other capital; stock; NACE'03

Source: Hungarian National Bank

Table 2 Outward FDI (stock) in Financial and insurance activities, 2008-2012 (million euros)

	2008	2009	2010	2011	2012
Financial intermediation	2 547,5	2 655,9	2 947,8	2 607,9	2 215,8
Insurance	12,6	12,3	18,5	14,1	25,2
Total	2 577,5	2 689,7	2 990,2	2 644,5	5 312,5

¹ As we will see later, MKB sold its Bulgarian subsidiary bank in August 2013, see e.g. http://www.standartnews.com/english/read/bulgarias_first_investment_bank_acquires_local_subsidary_of_hungarian_mkb-290.html and its Romanian subsidiary bank in January 2014, see e.g. <http://www.romania-insider.com/mkb-bank-sells-romaniens-nextebank/112265/>

Note: NACE'08

Source: Hungarian National Bank

The relative importance of OFDI in financial services in Hungary has changed considerably over time compared to other new EU members, in which OFDI is significant. Financial services was the dominant sector compared to the Visegrad economies before the crisis (Sass and Radlo, 2011). However, this has changed considerably over the crisis years – as in all other countries in the region. (Table 3) In 2012, Hungary had the third highest share of financial services in overall outward FDI stock among the analysed countries

Table 3 Share of Financial intermediation in total OFDI stock, %, selected economies, 2008 and 2012

	2008	2012
Czech Republic	7.3	62.3
Estonia	37.1	9.3
Hungary	16.6	20.0
Poland	25.1	30.1
Slovakia	17.5	6.5*
Slovenia	18.2	10.2
<i>Memo item: Austria</i>	<i>31.0</i>	<i>24.9</i>

Source: OECD International Direct Investment Statistics 2014, http://www.oecd-ilibrary.org/finance-and-investment/oecd-international-direct-investment-statistics_2307437x

Note: data for 2011

In spite of the decline in relative significance of Hungary as an outward investor in financial services, the main investor, OTP Bank is still the only significant regionally-controlled player in that area together with the Polish PKO Bank. (Raiffeisen Research, 2015) Other banking players in the region are coming from Western European countries (and smaller projects appear from Russia). Thus increasing outward FDI from other countries of the CEE region in Table 3 may be mainly of indirect nature.

The paper is organised as follows. After presenting the theoretical framework, the main aim of the research and the methodology used are shown. The next section provides information about the two main foreign investor banks in Hungary. This is followed by the analysis of their outward investments in various areas (indirect versus direct investors, ownership advantages, strategy, motivation, entry modes, choice of location, impact of/on the home economy; and the impact of the crisis). The last section concludes.

2. Financial OFDI and multinational banks – theoretical framework

The emergence of multinational banks can be explained using the theory of multinational enterprises. Thus banks may have different motivations when expanding abroad. Due to the nature of bank activities and the relative fragmentation of markets (due to national regulations), the most important motivation can be to access new markets (especially in relation to developments in the domestic market), thus the market-seeking motive dominates. Furthermore, banks can improve their efficiency through lowering costs or increasing revenues, or through economies of scale and/or scope, thus the efficiency-seeking motive may also be relevant. Furthermore, banks can gain important strategic assets and can diversify risks through their foreign expansion, thus the strategic asset seeking motive may also be relevant.

This paper uses Dunning's extended OLI framework for analysing the process of the internationalisation in the financial services sector. According to the OLI-framework, the investors must own an ownership advantage, which is based on intangible assets in order to be able to move abroad. Ownership advantages enable the foreign bank to compete with local banks in spite of its "liability of foreignness". On the other hand, this intangible asset may be used by the bank by keeping it inside the organisation and not "putting it to market forces", i.e. not to sell it on the market (internalisation advantage). This type of advantage in banking is usually connected to information: for example, a cognitive imperfection (Dunning (1981) and stems from the importance of the flow of information between the bank and the client, which is made mainly through personal contacts. Thus banks may follow their (important) clients to foreign countries – or vice versa. In their most updated form (Dunning- & Lundan, 2008), ownership advantages can be divided into asset-based advantages (Oa) such as cutting-edge technologies, marketing prowess or powerful brand names, and transaction-based advantages (Ot) such as common governance of assets and interaction with other corporate networks. From this it can be deducted that transaction-based ownership advantages are indirectly shaped and influenced by the home-country business and regulatory environment and culture. Furthermore, the locations of the investment must possess some specific advantages in order to be able to attract these investments (locational advantages). Empirical research shows that location-specific advantages such as size, human capital and cultural distance, do provide an explication of the internationalization of financial firms. (Outreville, 2007)

Another theory of "stages internationalisation" is used to some extent, when describing the geographical spread of the investments. According to the stages approach, which is described in detail in the Uppsala model, companies go through different stages of internationalisation. The first stage is the ad hoc export, the second is systematic exporting through an independent foreign sales firm, in the third stage a foreign representative company (for sales) is established, and in the fourth stage, a foreign production unit (affiliate) is established. (Johansson, Wiedersheim-Paul, 1975; Johansson, Vahlne, 1977) In the stages approach, a determining role is played by the decision taking capacity of the management, which is determined by available information, knowledge and experience. The Uppsala model underlines the importance of continuous learning based on foreign experiences, and thus how the stages are built on each other. Moreover, the importance of psychic distance is emphasized, thus in international transactions cultural, language and other differences act as barriers to the flow of information and thus the decision taking capacity of the company. Parallel with the increase in foreign experiences of the company, this psychic distance decreases.

3. Research question and methodology

The main aim of the present paper is to describe developments in Hungarian OFDI in financial services. On the basis of the analysis, we can relate the characteristics of Hungarian OFDI in the financial sector on one hand to the theories and empirical findings of multinational companies and banks and emerging multinational companies and banks. The main areas where the foreign expansion of Hungarian banks are analysed will be the following: direct versus indirect investors, ownership advantages, strategy, motivation, entry mode, choice of location, impact of/on the home economy and impact of the crisis.

The research is based on semi-structured, questionnaire-based interviews with leading managers of the two leading foreign investor banks in Hungary. Two interviews were conducted with the representatives of the two banks back in 2011 and another one with the representative of OTP Bank in 2015. The interviews were based on the same semi-structured questionnaire. Besides information from these interviews, data from the balance sheets of the companies and specialised journal and newspaper articles and texts of interviews with the CEO of OTP Bank were also used. This methodological approach can be justified by the extremely low number of important investors in financial services in Hungary, and thus the high concentration of investment in terms of investors. Furthermore, “qualitative research” could also be carried out using this method, which may supplement well and even correct results gained from quantitative analysis.

4. A short presentation of the two leading investors: OTP and MKB

4.1. OTP

OTP Bank, is Hungary's leading commercial bank. The legal predecessor of OTP was established in 1949, which was a nation-wide state-owned bank specialised in retail banking. In 1990 it became a public company and non-banking activities were separated. At present, OTP is the determining financial institution in Hungary as far as retail banking is concerned; in retail deposits it commands a market share of around 32%. Its share in the mortgage loan market is also above 30%. It is a market leader also in consumption loans (over 10% share) and the other loans category (over 20%). (Molnár, Holló, 2011) It owns the highest number of ATMs and branches in Hungary. Its market share is estimated to reach 19.3% in Hungary, according to Raiffeisen Research (2015).

The privatisation process of OTP Bank was launched in 1995. It was privatised through the stock exchange, in three “tranches” (1995, 1997 and 1999). As a result of three public offerings along with the introduction of the bank's shares into the Budapest Stock Exchange the state's ownership in the bank decreased to a single voting preference (golden) share. Individual foreign shareholders were limited to 5 %, and domestic shareholders to 10 %. By the end of the decade, the bank's privatization had been completed and nearly all of OTP's shares had been placed on the Budapest exchange. In 2008, OTP sold one of its subsidiaries: the French Groupama S.A. acquired its insurance business line, OTP Garancia. At the same time, Groupama S.A. has acquired 8% of shares of OTP Group. Currently the bank is characterized by dispersed ownership of mostly private and institutional (financial) investors. In

March 2015, 60.06 % was in the hand of foreign investors. Above 5 % was held by Megdet, Timur and Ruslan Rahimkulov (8.88 %), the French Groupama (8.29 %) and the Hungarian petrol company, MOL (8,57 %) as well as the Lazard Group (5.1%). The state owned 5.03 % (until 2007: a golden share); through the Hungarian National Asset Management Inc. Employees of OTP held 1.24 %.² Thus while the majority of OTP's shares are held by foreigners, they are widely dispersed, with no controlling shareholder, and Hungarian shareholders are also numerous and none of the foreign or domestic shareholders own more than 10 per cent of the shares. Due to the regulations of the banks, none of the above 5% owners have more than 10% of the voting rights.

OTP started its "shopping spree" in the region after its privatisation was finished in 2001, when it acquired IRB in Slovakia. At present has foreign operations in Romania, Slovakia, Croatia, and Bulgaria (where its subsidiary, DSK Bank, has become market leader), in Russia, Serbia, Montenegro and Ukraine. In 2008, OTP sold its insurance company to the French Groupama, and together with that, foreign affiliates in insurance in Slovakia, Romania and Bulgaria were also sold. In terms of market shares, the Montenegrin bank is a market leader, and the Bulgarian bank also has a relatively high market share: almost 14 per cent and is a market leader in the country. In other countries, the local subsidiary of OTP is of minor importance with 0.4 to 3% market shares, with significant operations only in certain niche segments. (Raiffeisen Research, 2015) Altogether, it has 11.9 million customers in the region and thus it can be regarded as one of the leading banks of the region.³ The bank's total employment in 2014 was almost 36000 persons.

4.2 MKB

MKB (Magyar Külkereskedelmi Bank, Hungarian Foreign Trade Bank) was established in 1950 for managing currency transactions connected to foreign trade. In 1987, with the introduction of the two-tier banking system in Hungary, it became a universal bank with extending its operations. Its privatisation process took place between 1994 and 1996. In 1994, Bayern LB (25%) and EBRD (16.7 %) gained minority share. In addition, in 1994, the Deutsche Investitions- und Entwicklungsgesellschaft (German Investment and Development Society) acquired 8.3 % of the shares. In 1996, BayernLB bought an additional 25.8 %. Through further acquisitions and increases in the base capital, Bayern LB became the main owner. At present, it is owned by Bayerische Landesbank, München, Germany (89,89%) and P.S.K. Beteiligungsverwaltung GmbH, Vienna, Austria (9.77%).

In 2011 it was among the leading banks in Hungary, especially in corporate lending and corporate deposits. It was market leader in factoring (25.3% market share) (Molnár, Holló, 2011). However, the bank made considerable losses during the last years of its Hungarian operations.

² See <https://www.otpbank.hu/portal/en/IR/Shares/OwnershipStructure>

³ <https://www.otpbank.hu/portal/en/AboutUs/History>

In terms of acquisitions, at first it acquired a domestic bank: Konzumbank in 2003. In 2005, the first foreign acquisition of the affiliate was realised in Bulgaria, where it acquired the majority of the shares of Unionbank, and in 2006, Romexterra Bank in Romania was bought. The acquisition price was not disclosed in neither cases.

The parent bank, Bayerische Landesbank incurred large losses during the financial crisis because investments into sub-prime mortgage securities in the US. One of the conditions of the following government bailout set by the relevant authorities of the European Union in 2012 was to sell the Hungarian subsidiary, MKB Bank before 2016.⁴ Before that, as it was already mentioned the two foreign banks owned by the Hungarian affiliate were sold.

MKB was sold to the Hungarian government for 55 million euros, and the parent wrote off 270 euros loans given to the subsidiary. Before selling it, the parent had to cut-up the Hungarian subsidiary bank and separate bad loans.

5. Various characteristics of financial OFDI from Hungary

As it was already pointed out, the two most important investors in financial services are OTP and MKB, they are responsible for the overwhelming majority of outward FDI in the sector. OTP Garancia, the insurance company was part of the OTP Group, when it realised its foreign direct investments, thus the characteristics of its OFDI are the same as those of OTP. The French Groupama took over OTP Garancia in 2008 together with its foreign affiliates in Slovakia, Romania and Bulgaria and kept the Slovakian subsidiary, while sold the others.

As far as the timing of OFDI in financial services is considered, OTP was the first to start its acquisition in Slovakia. The abrupt impact of the financial crisis is apparent from Table 4.

Table 4 Timing and geographical locations of investments by OTP and MKB

	2002	2003	2004	2005	2006	2007	2008	2013	2014
OTP	Slovakia	Bulgaria	Romania	Croatia, Serbia (1)	Serbia (2), Ukraine, Russia, Montenegro	Russia	Slovakia, Romania, Bulgaria		Romania
entry mode	Privat.	Privat.	Acqu. (from Turkish owner)	Privat.	all acqu.	Acqu. (local)	selling Garancia (insurance) to Groupa-		Acqu. (Portuguese owner)

⁴ <http://www.bloomberg.com/news/articles/2014-07-24/bayernlb-to-sell-mkb-bank-to-hungary-for-74-million>

							ma with the subsidiaries		
MKB				Bulgaria	Romania	(HAA)-	-	Bulgaria	Romania
entry mode				Acqu.	Acqu.	(failed acqu.)	-	selling local subsidiary	selling local subsidiary

Source: own compilation based on www.mkb.hu and www.otp.hu

The following areas and characteristics of the foreign expansion of the two banks will be analysed in this section: direct versus indirect nature of the foreign investment and foreign investor; ownership advantages and strategy; motivation; entry mode; choice of location; impact of/on the home economy and the impact of the crisis.

4.1. Indigenous versus indirect investors

It is important to distinguish between direct and indirect investors. Direct investors are domestically owned firms, while indirect investors are local affiliates of foreign parents. On the basis of the short descriptions of the banks it is obvious, that basically all OFDI from Hungary in the financial services sector can be evaluated as indirect, because both investors are in majority foreign ownership. However, it is important to note the difference between the two cases. In the case of MKB, it is obvious, that the bank is controlled by its major investor. If we simply take the level of foreign ownership at face value and equal it with the level of foreign control, then also OTP should be considered a foreign controlled bank. (This is the approach taken for example by Altzinger et al. (2003) or Rugraff (2010), where an above 50 % foreign ownership is taken as foreign control.) But while OTP is majority foreign owned, it is obviously not foreign controlled: it is not the foreign owner but the mainly Hungarian management which is taking all strategic decisions, including foreign acquisitions. In the senior management (CEO and 6 deputy CEOs) and the members of the Board of Directors (3 executive and non-executive members) there are no foreign citizens; nor are there any foreign managers reporting directly to the executive director. The official language of the company is Hungarian. Thus OTP while on paper it is majority foreign-owned, all decisions of strategic importance are taken by the Hungarian management residing in Hungary, including strategic decisions concerning among others foreign investments. Therefore, while the company can be classified as an “indirect” investor, due to the foreign majority ownership, we would rather call it qualifyingly a “virtual indirect” investor, because there is no single (or an identifiable group of) foreign investors holding a clear majority. (Sass et al., 2011)

“Virtual indirect” investments understandably are much closer in many characteristics to direct than to indirect investments. The most important distinguishing factor between “virtual indirect” and direct investments can be the higher exposure to risk in the case of “virtual indirect” investors, because they are more dependent on foreign/international capital and they are therefore more directly dependent on changes in the business environment in more than two countries. In the case of direct investors, it is understandably mainly the home and the host countries’ business environment which has a direct influence on the decisions and operation of the parent company. For “virtual indirect” investments, there can be further influencing factors in terms of the third country which acts as a mediator in the investments and/or further countries from which significant holders of shares are present in the ownership structure of OTP. In that case a minor influence can be attributed mainly to the French

Groupama, which operates in a similar sector as OTP. However, its voting rights are limited. Otherwise we could say that direct and “virtual indirect” investors are very similar to each other.

Why is it important to distinguish “virtual indirect” from indirect investments? (For more details see Sass et al, 2011). First, the motivations of investing abroad may be different in the case of indirect and “virtual indirect” (or direct) investments. Motivations usually partly reflect the relative competitive advantages of the home and the host countries. Thus in the case of the “virtual indirect” investments, the competitive advantages of the “real” home country must be taken into account. Second, their impact on the home country can differ from each other to a great extent, for example this has clear consequences for profit repatriation, transfer of capital, which again is realised between the host and the “real” home country. Third, the sustainability of foreign investments, the footlooseness of the investor company can also differ in the case of indirect and “virtual indirect” investors. As Rugraff (2010) points out, the outward FDI path of a given country may prove to be unsustainable or highly sensitive to strategic business decisions taken in another than the immediate home country of the investment in the case of indirect investments. This may result also in a high volatility of both inward and outward investments. OFDI realized by foreign affiliates residing in Hungary may prove to be more footloose than those realized by local investors, as the strategy of the multinational is determined by the parent company residing in a different country. However, in the case of “virtual indirect” investments, the home country where these decisions are taken, where the parent company is residing and the business environment of which influences to a great extent these decisions equals to the immediate home country of the investing company. Thus the high presence of “virtual indirect” investments in itself does not necessarily increase the volatility of OFDI.

Fourth, policy implications may also differ in the two cases. Governments of countries which are home to big multinationals support their “fellow country companies” especially of large size or if they are deemed to have strategic importance in their foreign operations through lobbying and exercising political influence. In that case, clearly, the ultimate investor matters. In the case of “virtual indirect” investors, the ultimate investor country equals to the immediate investor country. Fifth, statistical and data collection considerations can also be important. The presence of “virtual indirect” investors may result in false estimations of direct investments abroad; see e.g. UNCTAD (2006), p. 108.

4.2. OA/intangible asset and strategy

Foreign expansion through FDI is always connected to greater risk than domestic activities, including possible factors which cannot be managed on the basis of experience gained in the country of origin. Thus the bank needs special resources in order to be able to internationalise successfully. It is important to see what are those intangible assets or competitive advantages which enable these banks to successfully enter a new market and efficiently compete with incumbent banks. Such ability can stem from specific human and financial resources at hand, banking techniques, specific banking experiences, organisational skills, skilled personnel, etc. (Mutinelli, Piscitello, 2001)

The Hungarian economy provided a special business environment for OTP to be able to internationalise. The presence and operation of international competitors occurred the first here as Hungary was the first among transition economies to privatise banks to foreigners. With the appearance of ‘Western-style’ banking, existing, non-privatised banks had to face an increasing level of competition. Hungary was the first among former transition countries to open up its economy to FDI, including FDI in the banking sector. This has resulted in improved service and products for local affiliates of multinationals and also for Hungarian firms, together with the introduction of innovative financial products to the Hungarian consumer, such as consumer credits. (Akbar, McBride, 2004) Both the method and the timing of privatization matter to performance; specifically, voucher privatization does not lead to increased efficiency and early-privatized banks are more efficient than later-privatized banks. (Bonin et al., 2005) These factors all played a role in shaping the ownership advantages of OTP. In 1992, Sándor Csányi, was appointed chairman and CEO of OTP Bank, who with his management team started to reorganise and modernise the operation of the financial institute in this increasingly “market-like” business environment. By the end of 1994, OTP had reduced the number of managers from more than 200 to 65, and many of these were replaced by young, talented managers. The bank slashed more than 8,000 jobs by the end of the decade. It centralised its back-office operations and developed and introduced its own IT. It was the first to appear on the Hungarian market with novelties such as debit cards, mobile telephone banking services, and Internet banking services. Its dominant position in Hungary and the successful reorganisation of activities resulted in strong capitalisation, which made OTP an attractive target for acquisitions. This push factor together with the accumulated knowledge about restructuring and operation in an evolving market economy environment induced the bank to carry out its first foreign acquisition in a neighbouring country with a significant Hungarian minority population, in Slovakia. It also played a role in further acquisitions. This type of ownership advantage could result in successful foreign acquisitions only around until 2005, because after that there were no privatisation-related “target-banks” in the region. Dynamically, by that time, OTP could change its ownership advantage and rely more on its knowledge about operation in an evolving market environment and it could move in and specialise in certain market niches in its foreign operations, especially in countries, where it had only a very low local market share.

In the case of MKB, the “story” is completely different. The German parent bank realised the opportunities the region had to offer already at the beginning of the years 2000. It had an unsuccessful attempt at acquiring a bank in Croatia, where there were management errors as well. After that, in 2005 a decision was taken, that with close parent control, the Hungarian bank, the management of which is much more familiar with both the region and the modus operandi in it, will be responsible for the acquisitions in the region. The parent bank made the final decision and looked for possible target banks as well. The parent selected the target countries, which were Bulgaria, Croatia, Romania, Serbia and Slovakia on the basis of having there close Hungarian ties. Another reason why the Hungarian subsidiary was selected was that foreign acquisitions would target retail and SME banking, in which the Hungarian subsidiary had considerable experience (the parent dealt mainly with large-sized clients). (Connected to that the Hungarian subsidiary launched a new retail model in Hungary in 2005.) At the end, MKB acquired two foreign banks, the original target was more, but in Serbia, they were outpriced by Greek banks, then the crisis made further acquisitions impossible and the parent even had to sell its Hungarian subsidi-

ary, as we shall see later. Thus the ownership advantages of the Hungarian subsidiary again are connected to a special (local/regional) knowledge, which the parent bank does not own.

According to the theory, certain ownership advantages of firms or banks follow rather than lead internationalisation, because they may pursue asset seeking strategies before converting to market seeking ones. It may also happen that assets and markets are sought for simultaneously. In the case of OTP and MKB, we could not see this type of changes.

4.3 Impact of/on the home economy

Impact of the home economy is especially important in the case of OTP in shaping the (initial) ownership advantages of the bank, thus providing it with transaction-based advantages. First, the mode of privatisation gave an opportunity and resulted in the experience for the management to be able to privatise and restructure formerly state-owned banks. Foreign expansion based on that experience than was the basis for gaining further experiences in the various stages of the post-transition business environment. The mode of privatisation acted as a kind of push factor because being on the stock exchange and having strong capitalisation made OTP an easy target of acquisition, and thus induced the management to strengthen its position by foreign expansion.

Impact on the home economy: according to all the interviewed experts, this is minimal, a minimally positive impact is provided by slightly higher employment. Synergies and thus decrease in costs are minimal. Centralisation of certain back office activities was of very small size in the case of OTP, thus resulting in a small increase in employment. The indirect impact of making the bank more stable due to foreign operations and the possibility of financing home country losses from the gains abroad may be more important, especially that in Hungary the banking sector is put on high burdens from 2010 on.

4.4 Motivations

The motivation in both cases is clearly market-seeking, the efficiency-seeking motive is not present. First of all, representatives of both banks said that their main targets are local customers, as the representative of MKB put it: “90% of customers is completely local”. During the interviews, none of the interviewed bank representatives deemed it important that there would be significant benefits from synergies or economies of scale and scope. OTP Bank made an attempt to centralise a few back office activities, but it was not possible for all the subsidiaries due to local regulations prohibiting the transfer of customer data abroad. In a few cases, there were common purchases of inputs (e.g. machinery, software), but this is also more an exception than the rule as the experience is that affiliates could attain better bargains locally. There are a few examples of sharing best practice in key activities, such as risk management, and new product development and allocating funds effectively, which is important for catching-up and remain competitive in international markets, but overall, the local subsidiaries are basically independent.

An interesting case is the motivation to follow important clients abroad – either by the bank or by its customers. According to the interviews, in the case of OTP, in countries, where its market share is small and operates mainly in niche-markets, that is true only for certain activities, but the bank could not become a primary bank for these important Hungarian foreign investor companies (e.g. MOL, Richter). However, it is not their primary bank neither in Hungary. In the case of MKB, the “follow” client” motivation was present for some smaller Hungarian companies, and for certain German ones, but in the latter case, this was not automatic, the local subsidiaries had to contact those German companies, which were present locally. In terms of the motivations of the banks to go where important investor companies from their own home countries are present, was not the case.

4.5. Entry modes and choice of location

As far as the entry modes are concerned, emerging multinational banks are more inclined to set up small ventures in “unknown” territories, even in the form of greenfield investments. (Petrrou, 2007) On the other hand, in the banking sector, acquisition is the main entry mode, as it provides ready assets, knowledge, reputation, access know-how in technical areas, and gives an “easy way” to increase size (Dunning, Lundan, 2008). In the case of the two Hungarian investors, acquisitions either from foreign or local owners, or from the state (privatisation) are the dominant entry modes in countries, which are geographically and culturally very close to Hungary. As we saw, in the case of OTP, its competitive edge laid in the capacity and ability to transform formerly state-owned, uncompetitive and overstaffed banks into competitive ones. Thus until 2005, privatisation-related acquisition was the main entry mode. Even for greenfield purposes, acquisitions are used, as was the case when OTP acquired a Romanian bank “for the licence”, as its previous and later attempts proved to unsuccessful in acquiring a larger Romanian bank in the framework of privatisation. Later on, as the ownership advantages of OTP changed and as privatisation targets disappeared, OTP’s entry mode changed to acquisitions. On the other hand, for OTP Garancia the entry modes were mainly through greenfield investments, connected to the local affiliates of the OTP Bank, low investment requirement makes possible a greenfield entry. For MKB Bank, both foreign banks were acquired independently of privatisation (and the failed attempt was also an acquisition).

As far as the geographic locations of foreign investments are concerned, both banks concentrate on their immediate regions. One common reason for that is the relatively low physic distance. For OTP, according to the interviews conducted with the representatives of the bank, when it acquired the Slovakian bank, one of its aims was to serve local Hungarians. A similar goal was to be achieved in Romania, and to a lesser extent, in Serbia, where the affiliate is headquartered in Novi Sad (in Hungarian Újvidék) – with a Hungarian minority population. (In all these three countries, there is a Hungarian minority population of considerable size.) However, according to the interview, at present Hungarians are clients of the local OTP affiliate in greater proportion only in Romania. The second common reason for the two banks is the low psychic distance due to common socialist heritage and the common elements of the consequent transition process. These banks have a competitive advantage due to their knowledge about how a “socialist bank” operated and how to transform it into a

competitive Western type bank. This obviously played an important role in the case of the Bulgarian bank bought by OTP, according to one interview, this bank was the equivalent of the Hungarian OTP in Bulgaria and due to the later start of Bulgaria in the transition process, OTP could use all its accumulated knowledge there. In the case of MKB, according to the interview, after some failed attempts of acquisitions in the region, the German parent bank decided to rely on the knowledge and experience of the Hungarian subsidiary, and thus it was assigned the responsibility for the takeover of the Romanian and Bulgarian banks. Thus especially in the case of OTP, internationalisation is obviously taking place in “stages” (Johansson and Vahlne, 1977), in terms of going from one location with a lower psychic distance to another one to a higher one and so on. In the case of OTP, confidence and experience gained in geographically closer countries provided the basis for changes in intangible assets and thus in ownership advantages and enabled the bank to access further markets with higher psychic distance, as for example Russia.

4. 6 The impact of the crisis

As we could see in Table 4, the crisis brought considerable changes for both banks: it first stopped their acquisitions in the region. (On the other hand, acquisition targets were missing, and the existing ones were too expensive reflecting the local problems of banking in the countries of the region.) The crisis induced OTP to sell the insurance arm and around 8% of its shares to the French Groupama for around 600 million euro – this helped OTP to weather the crisis and the consequent negative changes in the Hungarian banking environment. OTP could not really restart its regional expansion since the crisis, it was first in 2014, when further acquisition of shares in a partly-owned by OTP bank in Romania was announced. However, even that transaction was of minor importance in terms of its value.

In the case of MKB, the parent bank had to sell its Hungarian subsidiary already during the crisis, due to fulfilling a condition of its bailout by the German government carried out in 2008. Because the bank could not have been sold in one part, the German parent bank, Bayerische Landesbank first induced the Hungarian subsidiary to sell the two affiliates: the Bulgarian one in 2013 and the Romanian one in 2014. Later on, the Hungarian subsidiary itself was sold to the Hungarian state for 55 million euros in July 2014.⁵ The transactions resulted in relatively large losses for the German bank, however, that was the condition of the bail-out posed by EU antitrust rulings. Thus MKB Bank ceased to exist as a multinational bank during the crisis – and due to crisis-related developments in the parent bank.

⁵ <http://www.bloomberg.com/news/articles/2014-07-24/bayernlb-to-sell-mkb-bank-to-hungary-for-74-million>

6. Conclusion and further research

The paper examines in detail the foreign investment activities of the leading investors and changes in it during the crisis. The methodology applied is detailed case studies of the main investor banks, based on semi-structured interviews with leading managers as well as other information collected from specialised newspapers and journals and the bank balance sheets. As far as the preliminary results are concerned, we distinguished indirect and virtual indirect investors: while OTP Bank is foreign majority owned, the strategy of the bank is determined by its controlling owner(s), which are the members of the Hungarian management due to the dispersed ownership structure (no foreign investor has more than 10 %). On the other hand, MKB Bank was a 100% foreign-owned bank with a German owner in the pre-crisis period, the important role of the Hungarian management is also shown when determining the foreign investment strategies of the Hungarian subsidiary. Thus, while the two cases would be clearcut cases of indirect investments, their closer analysis reveals important "deviations" from the textbook case.

In terms of the ownership advantages (OA) of the banks, we show the direct (MKB) and the indirect (OTP) connection between inward and outward FDI in terms of enabling the banks to develop their own OAs with experience in privatisation and restructuring of formerly state-owned banks and with learning how to operate successfully in a developing market economy environment with numerous competitors. We show that their motivation to invest is mainly market-seeking. Entry modes are acquisition in certain cases related to privatisation. In location choice, the importance of psychic distance is underlined in a wide sense (including a slightly belated progress compared to the home country towards the establishment of a market economy). We show the impact on the home economy being minor mainly in terms of benefitting from synergies, small employment creation in the parent bank and profit repatriation helping the parent bank (OTP) during the crisis. The direct impact of the crisis is shown for the performance of the banks and their internationalisation strategies and its indirect impact on changes in the ownership structure of MKB.

Further research is needed in terms of relating the characteristics of foreign expansion of the two banks to those of developed country banks and emerging multinational banks and to show the unique features of the former. Furthermore, the level of success of foreign subsidiaries needs to be analysed in order to assess the success of foreign expansion.

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E: Development, innovation and societal impact of knowledge

E1: Innovation and new business models in KIBS

Chair: Christina Castro Lucas

XXV. International RESER Conference: Teaching Strategy of an Innovative Service: A Case Study in the Context of Cybernetic Simulated Scenarios

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Cybersecurity receives great importance to society in general in multiple entities takes benefit from the use of networks and computer systems for storage, production and processing of critical data to its development. It is therefore of paramount importance to encourage both teachers and students in higher level to dedicate themselves to the formation of knowledge in this area. The Cyber Challenge aims to generate new skills, through the formation of networks in the cyber security area, encouraging actors from education to human resource training in a strategic area of technology for development. The first results of this strategy shows that it is promising for proper training of cybersecurity professionals.

1. Introduction

In Brazil there is a significant gap in what is called the innovation function, here translated from the relationship between the entrepreneurial effort of Brazilian businessmen and national spending on research and development (R & D) (Zawislak; Castro-Lucas; Souza, 2007). These authors presented a possible explanation for this gap: the absence of a scale innovation in Brazilian business culture. From there, it can be inferred that the implementation of an innovative culture need to start a new educational base.

Given this situation, the question arises: how to implement a change in the educational process in order to have the development of individuals in strategic positions, compared to innovative contexts? Or, how to develop new relationships between social groups in a dynamic market and in constant transformation? And finally, how to develop the new imaginary individual to enable attitudes that are likely to generate social value?

Ways of living, way of doing things, ways of thinking, creating and following rules and maintain moral, political and religious positions define, according to Da Matta (1984), the culture of each social group. These lifestyles define the relations between social actors such as construction of social practices, specifically the work. This confirms the importance of thinking culture as a social construct, dynamic, carried out from the history of relations of social groups in different times and spaces, not fully integrated.

In this line of thought, generate and transfer knowledge, information, skills and values are cultural events that build new social identities. However, it is relevant to ask to

what extent these manifestations are indicative of people who allow themselves to live experiences, organize and conduct practices, act courageously and creatively, committed to innovation, able to plan their lives and, therefore, their actions, forming social networks in which to move independently. Or how you can develop different attitudes facing what Delors (1996) shows how tensions between global and local, tradition and modernity, the long and the short term?

The demands resulting from the information age and the constant quest for knowledge in this system generate the need to create conditions for the teaching-learning relationship occurs in order to generate proactive people. In order to prepare individuals to make decisions autonomously and innovative way, it is essential that trainers/teachers are trained for the incorporation and use of new technologies, innovating the very didactic and methodological process and making room for multiple learning paths.

Thus, this research aims to evaluate a new way of working with undergraduate students of computer science departments, Computer Engineering, Mechatronics and Software Engineering at the University of Brasilia, and similar courses of Colleges of Brasilia and surroundings they can act in a new way in the action-reflection process, from the conceptual basis of the Service Innovation Theory, enabling students to be protagonists in the process of changing attitudes to new situations and thus develop strategic skills cyber security for the Brazilian market.

2. Theoretical Background

Given the size of addiction that almost all nations are exposed when it comes to connectivity in the last decade, many nations now include the issue of cyber security in their national defense plans, where the principle is not only cover the geographical boundaries of a country, but give it the means to protect national critical assets face the dangers of connectivity without boundaries.

The permanent and growing competition for world leadership in cybersecurity area, giants like US and China catch daily clashes. In the perception of the Academy of Military Sciences of China (2011), the world is at war, while nuclear war was a strategy of the Industrial Age, the war of internet is a product of the Information Age, and their conflicts tend to be highly destructive, seriously threatening national security and the very existence of the state.

Thus, governments, schools and businesses around the world began to worry about train professionals with specific expertise in this area. One of the certificates present in the cyber security market is the Certified Ethical Hacking (CEH) of the EC Council, which aims to train professionals to act against cyber terrorism and demands of information security. In Brazil, however, this topic has been visited just a few years, still relying on low priority in national investment, both in private and in public.

Given the above, this research has the general objective of developing an information security teaching methodology and electronic warfare, from exposure to tasks consist of computer networks available scenarios in a simulation environment, encouraging students to generate knowledge and improvement ideal techniques. This work aims to build a teaching and assessment model for cyber defense scenarios.

2.1. Modeling Teaching and Learning Strategies

The education sector has suffered several problems in order to meet demands arising from new technologies of education and knowledge. In this context, one of the great challenges of the education system is to create conditions so that the process of teaching and learning to occur effectively, generating skills that incorporate and use new technologies, innovating in the educational and methodological process, as well as forming networks of prepared individuals to make decisions autonomously and innovative way.

The question, therefore, is much more than building knowledge, is to create ambience to develop skills that enable people to experience experiments, conduct practices, act courageously and creatively, committed to innovation, able to plan their actions, forming social networks in which to move independently. As an example, Masztal (1986) proposes the technique of cyber sessions where small groups of participants need to respond quickly to pre-planned questions within a specified period of time. So the question is: how to use innovative teaching techniques to develop skills from points as against tradition and modernity; long and short term, opportunity and necessity?

Competence is understood in this work according to Durand (1998), the triad of knowledge, skills and attitudes (CHAs) comprising an integrated manner not only technical, but also social and emotional aspects related to work and life. Knowledge corresponds to know what and why to do, it refers to assimilated and structured by the individual information, allowing them to understand the world. The ability refers to knowing how to do something at the right time, that is, the ability to act according to pre-defined objectives or processes, involving techniques and skills. The attitude with respect to emotional and social aspects related to work. It includes the identity of the individual with the organization's values, therefore their commitment and motivation to meet the standards of behavior expected to achieve results at work with quality.

3. Teaching Techniques and Aims

3.1. The Project: Cybersecurity Course

The Cybersecurity Discipline Project seeks to relate theory to practice understood as inseparable dimensions for a reflexive analysis of reality. On the other hand, this project in it took into account mission, future vision, values that can guide the process of teaching and learning, especially those who are facing human development, social inclusion and social responsibility. In addition, the four pillars of education - learning to be, to do, to live and to know - were taken as focal guidance for the development of this work.

The discipline of project includes articulated and flexible strategies that underlie the actions of teachers and students, aimed at training people participatory, creative, innovative and critical dimensions, these constituents of a competitive edge attitude.

Cybersecurity discipline in its objectives, goals, strategies and activities focus on the development of attack attitude, this dimension that aims to develop people as well as participatory, critical, reflective, and creative, they are committed to innovation and to

the exercise of social responsibility. This was done initially thought the generating principle that guides the development of disciplined and all activities which are geared to the themes entrepreneurship and innovation.

3.2. Principle Course Generator: Teamwork and the Logic Action – Reflection – Action

People think, act and feel differently, and most of the time, living the same situations and problems, seek different solutions, making it essential to consider the teaching-learning processes the differences in ways of thinking and acting of the actors. In a contemporary context, the requirement to work as a team and find quick and effective solutions becomes imperative the use of learning techniques that maximize this type of task (Moskovic, 1996).

In this line, the strategies will be considered that students have adopted the group, each adapting their existing cognitive structures. What allows the generating principle of this development plan follow the logic Action - Reflection - Action, Action and the experiences, knowledge and values existing in the cognitive structure of the students; Reflection time of transfer, creation of ideas and information and integration of the cognitive structure of students, basing new information. From this interaction follows a new phase of action now aggregate of new knowledge and values, resulting in the growth and development of the actors involved in the teaching-learning process. With this principle is expected to create conditions for teaching - learning process, significant, with materials and sound technology and related knowledge to students.

3.3. The Course Implementation Process

The teaching-learning process will be through connections between events, facts and concepts. The concepts will form conceptual systems, or set of logically connected concepts. The facts can mean the very events that occur spontaneously or provoked. On the other hand, they may also refer to the registration event, for example, as a match or verbal statements and responses based on mathematical event records (Gowin, 1970).

Thus, the teaching-learning process happen by interrelation between facts and concepts mediated events that trigger questions-questions, which identify students' interest, giving focus to work. Importantly, this process is not linear and takes place in the interaction of thinking to do, "the construction of knowledge and its convergence on objects or events" (Moreira, 2006). This is achieved by the concept of interaction with the method where thinking is bound to principles, basic concepts and worldview, and to the values, knowledge, experiences, interpretations, data transformations. The interactions of thinking to do develop through issues that lead to holding events which become the focus of the work. Learning view this way can be called meaningful in which to Moreira (2006), the production of knowledge is the result "of the constructive integration of thinking, feeling and doing (acting, acting) in a context".

The strategies for the implementation of discipline revolve around the playful process, problem solving, generating innovative ideas, development of perception capacity; developing the ability to work in teams and leadership, generation and application of new forms of knowledge from prior knowledge, new information and

creativity (Silveira; Ataíde; Freitas, 2009). Moreover, it is foreseen to develop future visions to be found new ways and alternatives of life and social integration of students.

With playful are articulated cognition, affection, motivation, creativity and socialization that will act in self-concept, self-determination and self-esteem. With organization, dynamism and planning the game prepares for teamwork and encourages decision-making, favoring the learning process. The playful activity allows the general education of students, implementing values for the formation of partnerships, social networks and coexistence.

Problem situations arise every day in people's lives, making necessary the development of previous abilities and skills focused on solving these problems. This development provides students to identify problems, preferences, feelings, frustrations, and seek solutions and new ways to overcome challenges and obstacles.

The generation and application of new forms of knowledge from prior knowledge allow the creation of ideas, acquiring experience, processing of information, the development of practices to life; the clearer perception of social reality and the changes of contexts. Change and learning "go hand in hand" and how innovation is changing, learning, say Davila, Epstein and Shelton (2007), it is an "intrinsic part of the innovation process".

Learn to act, to make it happen, can be developed in teamwork where the participants generate ideas, develop shared visions of the future, seeking new paths and ways to improve their environment, their actions and their lives. The generation of innovative ideas happens more collaborative, challenging, creative environments. This structured environment to learn and become, investing in innovation. In addition to these strategies an important step in the discipline proposed here is the formation of a value system driven by the learning communities context of culture and that can be implemented intra and extramural this community.

The operationalization of discipline in order to develop entrepreneurial attitude aims to make students able to develop various skills. Among them, the most important is to develop teamwork in order to generate positive impact to solve everyday problems, from innovative solutions. This is done by identifying opportunities presented within the context and the ability to learn and share lessons from experiences.

Group work usually involve at least one person with leadership characteristics. These people are expected to take initiative with determination and know acting and directing others to be persistent. Also, theirs is also expected a greater ability to identify errors and their causes, committing to the actions to be developed and performing positive feedback to your team.

Finally, it is expected that each student is motivated to undertake research, search, report and write information, this being primarily intrinsic motivation. Despite the leading role, it is expected that all students have critical sense to plan, set goals and targets in the proposed actions. It is not necessarily expressed in a specialization of each of the skills needed to develop and create attack networks for each student, but a general understanding to analyze the presented environment, identifying interesting points, difficulties, features, obstacles and challenges which the student is able to intervene.

For the discipline's objectives are achieved, certain expectations are postulated on educators. They should be able to create ambience for the development of activities in order to bridge the gap between reality and simulated cyber scenarios. Such activities should be accompanied by pre-programmed oriented which sought to clarify the best way possible doubts that can be expressed by the students. The teacher should also plan and record actions taken in the discipline, as well as participate in the activities of the teaching-learning process of study and evaluation meetings. That way he will be able to ensure that the expectations of students are met. Finally, they must participate in continuing education activities, updating and acquiring skills for the development of the discipline.

3.4. Working Method

It was provided to the teams a world-class computing environment for simulation of attack and defense scenarios. This is the Cyber-Range-In-A-Box (CRIAB), a technology developed by Boeing and available from Maxtera, Brasilia company specializing in information intelligence, for the simulation of computer networks and exploiting vulnerabilities.

The challenge consisted on the execution of a set of 15 tasks distributed over five different targets (hosts in the range), with three tasks to be executed in each target. These three tasks to be executed after taking control of the host (that is, after acquiring root/administrator privileges) were to establish an inverse remote shell from the host; to change, in the host, a disk file requiring root/administrator permission; and to bring down or bring up a system service on the host.

The proposed range consisted of a simple network with four hosts behind a router. Teams were informed only about the external router interface IP address. The hosts in the range ran different operating systems and services, providing several different opportunities for attacks. The range topology is shown next.

Each team received a similar set of tasks, with the same level of difficulty and the same value in points, to be executed over a total of five accesses to the CRIAB environment, each of them consisting of a period of four consecutive hours. Each access was supposed to be performed through wireless communication using the team's own laptop. To summarize the intensity of challenge, each team was required to execute 15 tasks, requiring control of five hosts, during a period of 20 hours.

After finishing all its accesses to the CRIAB environment, each team was supposed to turn in, within 24 hours, a Final Execution Report. This report should contain the description of the attacks perpetrated by the team and the tasks it was able to successfully accomplish. The evaluation of the report was done following these percentages: fifty percent for technical correctness; thirty percent for good concatenation of ideas; and twenty percent for writing correctness in Portuguese.

The total number of points achieved by a given team would be given by the expression $PT = n * 10 + Pr$, where n is the number of tasks successfully accomplished by the team, 10 is the number of points for each successful task, and Pr is the number of points awarded to the report. The winning team was the one to achieve the greater number of total points.

4. Results

All teams managed to identify all target hosts in the range and perform at least one task. A summary of their achievements is shown in Table 1 below.

Table 1 – Summary of each team achievement on the challenge. Are showed a letter to identify each team, the number of valid targets and valid tasks, quality of the final report and some comments on their overall performance.

Team	Valid targets	Valid tasks	Report	Comments
A	3	3	Technically detailed, with logs	Focus on methodology and activities; developed some code and scripts to perform attacks
B	1	2	Simple report	
C	1	1	Simple report	Tried to follow the Offensive Security Methodology
D	1	3	Very detailed and well organized, although long	Methodologically sound, focus on planning and management
E	1	2	Simple report	

Two teams clearly outperformed the others. Team D, although they identified all target hosts in the range, they were able to control only the router. Their report shows they managed the challenge as a project, taking each slot as a phase with thorough planning and preparation for the next slot. They were the runners up.

Team A won the challenge. Not only did they perform most in terms of valid tasks but they used some clever strategy. After controlling the router, Team A discovered the target network (20.0.0.0) and two other networks (198.18.0.0 and 10.50.184.0) which were the range configuration network to be the . Then they explored hosts on those two extra networks. They controlled the hosts in the range configuration network, launching a taylor attack, and identified that one of these hosts, which we call here host X for the sake of reference, was running Cacti. Although they haven't found vulnerabilities to explore, they downloaded the Cacti's code (from the Internet) and audited it. They managed to find a code vulnerability which they could exploit, wrote PoC code and ran it successfully, gaining root access of host X. Then, they found XML files in host X that defined the hosts in the range. With that information, they could control all target hosts in the range. Even so, they claim they couldn't find the Windows hosts, which didn't respond to ARP and Ping probes.

From the point of view of cyber warfare no difference was perceived between the simulator and reality (real systems). Thus, they can be considered identical. Also, the participating teams were seriously engaged into the Challenge and, in general, were able to get through the technical obstacles placed in their way. This observation

points to the possibility of the formulation of new Challenges in the future involving greater complexities. New Challenges in future activities and cyber contests can be envisioned using the CRIAB. It can be used to develop skills related to the training of technical teams in specific technologies through a cyber-contest focusing on Web applications and the exploitation of their vulnerabilities.

Given that the current cyber contest focused on system penetration, other contests could focus on system hardening (designing systems that cannot be broken into), or on both system hardening and system penetration. For example, there could be a contest in which two types of teams would compete, one designing a hardened system that is difficult (ideally impossible) to be penetrated and another attempting to break the system designed by the first team.

An interesting observation to be made is that it became apparent that the time span of 20 hours to perform 15 tasks distributed over 5 distinct hosts was quite a strenuous job. The competing teams spent much more time striving to take control over the hosts in which the tasks were to be performed than in performing the tasks themselves. Another interesting observation was that the fact that there were intervals in between each team's accesses to the simulation environment (CRIAB) was an important factor that allowed the teams to reorganize themselves and prepare for the next access.

During the preparation of the CRIAB for the contest it was apparent that the effort to configure and set up the simulation environment is still quite involved, demanding considerable time. This seems to suggest that the CRIAB would benefit from a more user-friendly interface (GUI). Also the use of off-the-shelf configuration templates would be recommended. While it is important to keep the step-by-step approach so that experts would feel free to create and innovate, the above mentioned suggestions, if implemented, would allow non-experts to be able to configure the CRIAB without much difficulty and experts to do it in less time, if they choose to.

Finally, the fact that one team was able to find the range configuration network and, more critically, the CRIAB control network, indicates that some engineering effort should be devoted to hide these networks from users precluding them to be tampered with.

5. Conclusions

The experience provided by the I Cyber Security Challenge College aimed at generating training and development teams in the following topics: a) the cyber war point of view, no difference was seen between the simulator and reality (real systems). They can be considered identical; thus participating teams were seriously engaged Challenge and, in general, were able to overcome the technical obstacles placed in their way. This observation points to the possibility of new events of this size formulation, and involving greater complexity; b) the different types of cyber activities and contests in the future can be predicted using the CRIAB, which allows: training of technical staff in specific technologies; cyber contest focusing on Web applications and other forms of exploitation of computing environments.

Thus, the results show that this challenge reached the proposed objectives, positively impacting those involved in the actions, and meeting the requirements required by

the Notice. As a suggestion for future agenda, the laboratory of Maxtera in order to develop skills and generate human resources capable to work in the cyber security area, share of interest in relation University - Company for the viability of new research and discussions, as well as the development of new features for CRIAB, and other security platforms proposals.

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Developing digital self-care services in health care through value propositions

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The objective of the present study is to examine how value propositions for new eHealth self-care services can be used in developing services. We discuss theoretical knowledge from service research related to value proposition and self-care to form an understanding of the value creation process of a customer using digital self-care services in diabetic treatment. A qualitative research method is applied to empirically study the way entrepreneurs of startup companies developing digital self-services in healthcare make sense of the value propositions and use these to develop their business. The findings of the present study indicate that value propositions of such services emphasize the ease of use of the equipment and services that help customers to improve their life and treatment of their disease and offer peer support.

1. Introduction

In using services that support the well-being and health, typically the overall goal of the customer is to achieve a balanced and full life. Achieving good life quality concerning experienced health is of course a complex process including a variety of different aspects, but from the service development perspective, it can be examined through the concept of value creation process adopted from the current theoretical discussion within services marketing discipline. Closely related to value creation process, the concept of value proposition, on the other hand, has been introduced to help the service providers to support the value creation of the customers and more importantly, to communicate the potential value of its services to the customers. According to Frow et al. (2014) in increasingly interconnected and networked world, developing value propositions is fundamental, but despite of significant interest towards value propositions, there is still relatively little theoretical understanding.

As one of the new areas for application of information technology, health services and business opportunities related to these have raised a lot of interest among practitioners and academics, as well as decision-makers of societies recently. Health is not a commodity which people collect from the doctor and bring home. Instead, health and well-being arise from our genetic inheritance, the circumstances of our lives, the manner of our living and from the interventions of the health service (Cayton, 2006). According to Elg et al., (2012) concepts such as patient-centred care, patient involvement and patient participation are widely discussed in the health-care literature.

However, according to Fredericks et al (2012) at the organizational level, patient-centred care is a merging of patient education, self-care, and evidence-based models of practice and consists of broad domains of intervention including communication, partnerships, health promotion, and physical care. As a result of the unexamined discourse of knowledge and power in health care, the possibilities of patient-centred care have not been fully achieved.

Technology-based health services represent a broad variety of different kinds of services, but as one of the key aspect of these kinds of services, the self-care has often been emphasised. In health services, self-care in treatment and following the course of diseases has an increasingly important role in controlling the diseases. As one example of treatment in which the self-care is particularly evident and employed, is the treatment of diabetes, a disease in which fears concerning health are present every day in diabetic's life. Daily activities that diabetics need to do include, for instance, measuring blood sugar levels before and after every meal and calculating the amount of insulin for every meal. In addition, exercising and nutrition are also an important part of treatment of diabetes. Therefore, there is huge demand for self-care services to support the self-care of diabetics. This study has to offer some interesting implications from managerial perspective as well by providing insights into what kind of services could be developed based on value propositions for new eHealth self-care services.

Developing health services in general and self-care services in particular require a multitude of expertise from the service provider, including medical and technological expertise, but also service business knowledge and in-depth understanding of the customer. Intertwining all these areas of expertise can represent a challenge in many service organizations aiming to commercialise new services within this area. Achieving good life quality concerning experienced health is of course a complex process including a variety of different aspects, but from the service development perspective, it can be examined through the concept of value creation process adopted from the current theoretical discussion within services marketing discipline. Closely related to value creation process, the concept of value proposition, on the other hand, has been introduced to help the service provider to support the value creation of the customers and more importantly, to communicate the potential value of its services to the customers.

The objective of the present study is to examine, how value propositions for new eHealth self-care services can be used in developing services. To form a preliminary understanding, we will discuss theoretical knowledge from service research related to value proposition as well as literature focusing on self-care to form an understanding of the value creation process of a customer using digital self-care services in diabetic treatment. A qualitative research method is applied to empirically study the way entrepreneurs of startup companies developing digital self-services in healthcare make sense of the value propositions and use these to develop their business.

In the next section, we will take a closer look at the theoretical literature on self-care and value propositions to gain an overview of the value creation process of *the customer using digital self-care services in treatment of diabetes*.

2. Understanding the value creation process and building value propositions upon that

Lin et al. (2009) emphasize that in developing any services, the value creation process of the customer needs to be carefully detected. According to Nordgren (2009) as a value creator the customer influences his/her health and life quality to a degree that is relevant in health care. Value is created in the recreation of the value creation process and in interaction between the service provider and the customer who is usually the patient in health care context. An overall aim should be to create value by complementing, supporting and matching the value creation process of the customer. In practice, a possible support system for how health care services could be integrated fitting the value creation process of the customer is lacking.

McColl-Kennedy (2009) define customer co-creation in healthcare service as “activities with self or in collaboration with members of the service delivery network including self, family, friends, other patients, health professionals and the outside community”. This conceptualization of co-creation is consistent with the discussion of the customer value creation process as a series of activities performed by the customer as part of activities to achieve a certain outcome. According to Zainuddin et al. (2013) health service providers and customers are jointly responsible for the successful creation of value, leading to desirable outcomes for all stakeholders involved.

According to Cayton (2006) self-care means greater personal responsibility, a requirement to become active rather than passive in the pursuit of personal well-being and quality of life. Cottam & Leadbeater (2004) describe that the average person with diabetes spends about three hours a year with doctors, checking prescriptions and issues concerning general health. However, diabetics spend thousands of hours a year self-managing their condition. Therefore, it would be productive to offer diabetics services such as peer-to-peer support, better training and tools to cope with diabetes. In addition, it would be more productive still to encourage lifestyles, habits and the necessary supporting services that prevent individual developing diabetes (type two) in the first place.

Laing et al. (2011) point out that the Internet has opened up new virtual spaces for consumers to address issues of mutual interest, which offers customers the opportunity to exchange information relating to their shared field of interest. Health care is one of the sectors in which emerged virtual communities of interest provide health care customers an opportunity to share experiences and offer opportunities to undertake self-service activities independent of health care professionals and expertise. Hence, these kind of eHealth communities and services provide a range of new value

propositions. For health care customers and professionals, the utilisation of such virtual communities in the information society influences significantly the service encounter. Frow et al. (2014) describe the role of value propositions in an ecosystem as a shaper of resource offerings. They conclude that value propositions contribute to the well-being of an ecosystem as they provide a mechanism for balancing resource sharing. They also suggest the following five key premises concerning value propositions: “(1) value propositions are a co-created and reciprocal mechanism through which actors offer and attract resources, (2) value propositions in ecosystems arise from the value potential inherent in actors’ resources, (3) value propositions influence the composition of networks, specifically determining with whom actors choose to engage, shaping the nature of market interactions, (4) value propositions may change over time and shape resource integration within the service ecosystem, and (5) value propositions act as a balancing mechanism in the service ecosystem”.

In the next section, we the research methods of this study are discussed in more detail in order to find out the way entrepreneurs of startup companies developing digital self-services in healthcare make sense of the value propositions and use these to develop their business.

3. Methodology

This study utilized qualitative research methods to carry out the objective of this study. This study includes several different companies, which enables exploring and comparing multiple perspectives related to the research phenomenon of this study. Qualitative methods enable gaining the most complete picture from the research phenomenon of this study (Yin, 2013). The case study methods are being rediscovered in research concerning health services. Need for case studies in the health services context is driven by developments in managed care systems that link multiple components in new ways, producing "mega-systems" of great complexity. Further, the systems' rules are continually and rapidly changing. Finally, important corporate affiliations and motivations are extremely difficult to track, much less to understand. All of these conditions favor the use of case studies, over other empirical methods. (Yin, 1999.)

3.1. The research data

The empirical data consists of interviews of 10 entrepreneurs of start-up companies developing digital self-care services in healthcare. All the companies are located in Finland operate in the health services sector and are either in the market already or aiming at developing services to enter the market. This specific research setting has been selected due to the fact that these examined companies enable the exploring and comparing of multiple perspectives related to the research phenomenon of this study. The interviews of this study are presented in more detail in the table 1 below.

Table 1. The interview data.

Company	Type of data	Interviewee	Date	Duration
Company 1	Semi-structure interview	CEO	2.3.2015	64 min
Company 2	Semi-structure interview	CEO	3.3.2015	77 min
Company 3	Semi-structure interview	CEO	4.3.2015	59 min
Company 4	Semi-structure interview	CEO	6.3.2015	52 min
Company 5	Semi-structure interview	CEO	9.3.2015	57 min
Company 6	Semi-structure interview	CEO	10.3.2015	46min
Company 7	Semi-structure interview	Co-founder	11.3.2015	54 min
Company 8	Semi-structure interview	CEO	25.2.2015	63 min
Company 9	Focus group workshop	CEO	14.1.2015	229 min
Company 10	Focus group workshop	CEO	11.3.2015	161 min
Company 11	Focus group workshop	CEO	11.3.2015	87 min

3.2. Data collection

The primary research data of this study consists of qualitative semi-structure interviews and workshops. Altogether 11 interviews have been conducted over a period of 3 months. In addition to the 9 semi-structured interviews, also 3 focus group workshops were used as primary data in this study. The interview data has been supplemented with secondary data such as meetings and workshops.

3.3. Data analysis

The empirical data was recorded and all the interviews and focus group workshops were first transcribed. The analysis started by reading each transcript and by comparing transcript with other transcripts searching for similarities and differences. The interviews have been analysed by theme-based categorizing to address the objective of this study.

These categories included following issues: (1) what kind of ideas concerning digital services can be recognized from the data?, (2) what kind of actors are mentioned in the data concerning network of diabetes self-care?, (3) what kind issues are related to diabetes self-care?, (4) what kind of challenges the interviewees recognized concerning revealing personal data?, (5) what kind of value propositions can be recognized?, (6) what kind of customer values, benefits and needs can be recognized from the data?, and (7) what kind of possible business models can be recognized from the data?

The analysis included multidisciplinary perspective, which enabled analysing the empirical data from various perspectives. In the next section the key findings of this study will be discussed.

4. Analysis

The aim of the empirical analysis was to identify the way entrepreneurs of startup companies developing digital self-services in healthcare make sense of the value propositions and use these to develop their business. Some of the entrepreneurs are also diabetic themselves, which enables them to reflect their services through their own experiences as a diabetic.

As a result of the analysis, we identified five services (Reducing the fear concerning health, Generics testing, Enabling continuous learning, Personal trainer and Peer support facilities). In the following, we have divided the analysis chapter into subsections based on the themes that rose from the data based on the objective of the present study that is how value propositions for new eHealth self-care services can be used in developing services.

The interviewees felt that at the moment there are huge possibilities in the health care markets. It is actually one of the rare markets that is still growing despite the current economic situation. In addition, nowadays people constantly want to develop themselves, feel better and be happier, which of course creates opportunities in the health care markets.

4.1. Reducing the fear concerning health

Fears concerning health, such as fear of losing eyesight or a limb, are present every day in diabetic's life. There was clear demand for services that could reduce the fear concerning health issues of diabetics. This basic value element is an important notion, which helps the entrepreneurs of startup companies to develop digital self-care services and create value propositions based on the real need of the customers. One interviewee, who is a diabetic, summarized his constant worries concerning health:

"If I cannot keep my blood sugar levels steady, I might lose my eye-sight or my limb might be amputated."

4.2. Genetics testing

It was seen as an important value element that people can test his or her risk factors to type one diabetes. This creates huge opportunities for start-up companies to utilize in their service development. One of the interviewees mentioned that people are interested not only to test themselves but also their children:

"Nowadays, parents can test their new-born babies' risk factors to the type one diabetes."

4.3. Enabling continuous learning

In health services, self-care in treatment and following the course of diseases has an increasingly important role in controlling diseases. Self-care is particularly important in treatment of diabetes. Daily activities that diabetics need to do include, for instance, measuring blood sugar levels before and after every meal and calculating the amount of insulin for every meal. Therefore, there is huge demand for self-care solutions for diabetics. One possible service could be an application using personal data to provide treatment instructions and recommendations for diabetics related to e.g. nutrition and physical activity.

"All this must be constantly learned, and constantly my body changes. Although I would learn how all these issues would influence, the next year they influence differently."

4.4. Personal trainer

Exercising is also an important part of treatment of diabetes. Nowadays, diabetics receive some help to nutrition, but still not enough help related to physical activity. There was also demand for personal training services especially specialized in providing guidance to diabetics.

"With nutrition you get some help nowadays, but with exercise hardly yet."

4.5. Peer support facilities

There were also huge demand for services that would be built around digital service and related applications to facilitate peer support, which was seen very important for diabetics to share information on self-care, and to deal with changing situation and emotional stress.

“We have this local peer support group, where we share the difficulties that we face. – and we discuss about exercising and about newest equipment and applications.”

However, also challenges related to utilizing personal data in developing services emerged clearly from our data. These challenges relate to customers’ reluctance to reveal personal data and to their concerns over how their personal data is used and shared.

“If I send my personal data to somewhere and someone makes an analysis of it, I don’t really trust those. --- We have thought a lot about what kind of permissions will be needed from individuals or is it needed at all to use the data in aggregate form. “

According to the analysis of the interview data of this study, customers prefer value propositions that promise easy use of equipment and services, and possibility to have a balanced and full life. These value elements help to understand better the value creation process of the customer using digital self-care services in treatment of diabetes.

In the next section we will discuss about the findings and describe both theoretical and practical implications of this study. This study is concluded with evaluating the limitations of this study and by providing future research ideas.

5. Discussion

The findings of our analysis suggest that value propositions need to be integrated into the service development of the digital self-care services in health-care. We were able to identify different services and examine the emerging value propositions related to these services as they were perceived by the entrepreneurs. It is not a surprise that the ease of use is critical in such services, but one of the key arguments that the present study makes is related to the usefulness of the value creation process approach in developing these kinds of services. Within this specific context, it is crucial that the service providers take a broad view on the customer’s value creation process to provide services that add value to the broader processes than merely those that the service is directly connected to. The overall aim of the customer in his/her value creation process is not to monitor blood sugar levels but to live a full and healthy life. The services should support the customer in this. The customers prefer value propo-

sitions that promise easy use of equipment and services, and, more importantly possibility to have a balanced and full life. Value propositions based on this are more effective than mere descriptions of the individual service, but of course, on the other hand, the customer needs to feel that the use of individual services advances the overall aim.

There was demand for service application using personal data to provide treatment instructions and recommendations for diabetics related to e.g. nutrition and physical activity. There was also demand for digital services and related applications for diabetics to facilitate peer support, to share information on self-care, and to deal with changing situation and emotional stress. There was also demand for personal training services specialized in providing guidance to diabetics. However, also challenges related to utilizing personal data emerged clearly from our data. These challenges relate to customers' reluctance to reveal personal data and to their concerns over how their personal data is used and shared.

The entrepreneurs of start-up companies recognized that the customer valued services that enabled them to reduce their fears concerning health, possibility to test risk factors to type one diabetes, tools that enable continuous learning concerning diabetes and its self-care, need for personal training and peer support facilities. These value elements form the basis for creating right kind value propositions for the targeted customers (diabetics and families, who have diabetic children) and developing their business and services to better correspond to the needs of the customers and to the current demands in the health markets.

We recognised that the customer is in the centre in developing services based on value propositions for new eHealth self-care services, and the value propositions support the value creation process of the customers.

5.1. Theoretical implications

Our study adds to the existing knowledge on value propositions, especially by demonstrating that in developing digital self-care services in health care, the value proposition is a critical tool in service development. This study contributes to the knowledge of how value propositions for new eHealth self-care services can be used in developing services.

5.2. Managerial implications

This study also carries several practical implications. The service providers and especially start-ups targeting their services to the health markets may benefit from gaining practical insights what kind of possible services targeted to diabetics have demand in the health markets.

5.3. Limitations and future research

Every research has its own limitations and this study is not an exception. There are limitations especially concerning generalization of the results of this study, for example, beyond the context of eHealth services. Generalization is also limited because the research data was collected in only in Finland, which makes it difficult to generalize the results as such to another country.

There are also certain limitations concerning interviews as sources of evidence (Yin, 1999). There might be, for example, bias due to poorly constructed questions and due to reflexivity the interviewees might give an answer that the interviewer wants to hear. Limitations concerning the questions have been minimized due to triangulation, which means several people have been involved in the formulating the questions.

Interesting future research possibilities include, for example, exploring the value creation process of the customer in health services in more detail to make it easier to target certain services to specific segments.

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**Obstacles of Innovation and innovation capabilities of knowledge intensive business service
sector in Palestine.**

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Introduction

The last two decades has experienced a growth in the number of papers that discuss the importance of knowledge intensive business service (KIBS) sector in the modern economic, and the increasing role that innovation can play to develop this sector and to enhance the role of service sector to enhance economic growth. However, in comparison to the manufacturing sectors, KIBS still not studied intensively by researchers and analysts of innovation and technological change, and their future development has rarely been considered in terms of policies and roles in their respective innovation and productive systems (Muller & Doloreux, 2007), mainly in developing countries.

Most of previous studies stress the close relationship between economic development and the growth of KIBS (Miles et al., 1995; Den Hertog, 2000; Schricke et al., 2012). Czarnitzki and Spielkamp (2003) denote that the importance of the KIBS roles as “bridges of knowledge’ and Innovation bridges which is “connecting the manufacturing sector with science and customer”, which also confirmed by Muller and Doloreux (2007) who emphasize the roles and functions of KIBS in creating and diffusing knowledge and fostering regions as innovation systems.

The Palestinian economy is considered as a service economy at which the services sector constitute the highest rate of the GDP and employment, which is considered a great opportunity to invest in. Palestine has limited natural resources and couldn’t compete in mass-production; therefore it should recognize the potential for the service sector which has less restrictions and limitations.

Among the service activities, KIBS is considered one of the most innovative subsectors which employ higher knowledge and technology (mainly information and communication technology) in comparison with other services and also manufacturing sector. KIBS in Palestine is divided between ICT, technical engineering, legal services, real estate, consultancies, and financial services. These services are also considered as a complementary for other sectors, therefore it could contribute positively in fostering the growth of productivity of many other sectors and as a result the overall economic growth.

Regardless of the political instability and the strict constraints Israel impose on the Palestinian economy, there is huge challenges to prompt the innovation capabilities in KIBS firms in

Palestine, some are internal (for example, the lack of understanding of innovation, lack of resources and the availability of skills and expertise among employees), and others are external to the firm (for example, knowledge and technology infrastructure in the country, external fund from government). Innovation limitations or barriers are also extent from cost factors, knowledge factors to market factors. Each of these barriers might hamper the ability of firms to produce innovation (product, process, organizational and marketing innovation).

In this work we will study to which level the barriers of innovation harm the innovation capabilities of firms in KIBS, i.e. the impact of innovation obstacles on the ability of firms to introduce innovation. In the first section we presented a literature review which includes a certain number of key theoretical and empirical arguments concerning the barriers of innovation and its impact on innovation behavior. In the second section, we introduced a descriptive statistics about KIBS sector in Palestine and the innovation capabilities or performance of the different KIBS activities. In section 3, we introduced the model and both dependent and independent variables with a descriptive analysis on each of them, also data source and analytical method. In the fourth section, we summarized the results of the empirical analysis and provide appropriate recommendations.

1. Literature review

Many articles have been clarified the reasons of innovation barriers and their impact on innovation capabilities for both developed and underdeveloped countries. The estimates of the effects of obstacles on the propensity to innovate are often unsatisfactory. Against the most indicated assumption of the negative impact of innovation obstacles on the ability of firms to present innovation, some researchers found a positive impact. Baldwin and Lin (2002) and Tourigny and Le (2004) explained the significantly positive coefficient associated with the variable obstacles of innovation. According to them, the obstacles of innovation indicate how successfully a firm can overcome these obstacles, which means that the innovation barriers motivate firms to introduce more efforts to overcome these barriers and so increase their innovative capabilities. Savignac (2008) explained the unexpected positive coefficient from the combination of two sources of bias: the endogeneity of obstacles due to unobserved factors

affecting both obstacles and the propensity to innovate has to be dealt with, and the inclusion of firms which not involved in innovation in the sample of interest, i.e. the sample of interest should only include the firms that are involved in innovation and that we label innovation willing firms.

Revealed and deterring barriers were studied by D'Este et al (2012). Data from the 4th UK community innovation survey has used to investigate the relationship between firms' engagement in innovation and their assessment of the barriers to innovation. The study reveals that in the cases of cost and market barriers, the relationship between assessment of the barriers and engagement in innovation activities is characterized by a non-linear relationship. Plotnikova et al. (2015) study the causes of innovative resistance and the parameters of existing barriers. Obstacles to investment into innovations are divided into 3 main groups; the group determined by the state action and infrastructure; the group depending on the form of activity support; and the group connected with education and management. The study shows that there are no signs of reducing the barriers to be efficient investment activity of the state. All the groups are characterized by the presence of parameters of an attribute appearance, but their change is not enough for a successful investment activity

The barriers to innovation that influence the innovation capability of Portuguese industrial firms have been studied by Silvia (1999). The data used in this study were collected by the OCT and population includes all the industrial firms with less than 20 employees. Many variables or factors such as the high economic risk, high cost of innovation, lack of financing and others are examined. The results show that firms innovate are those that have more perception of the barriers to innovation and the majority of the variables associated with the barriers to innovation present a negative signal which means these variables are considered as factors that difficult or limit the development of innovation activities

According to Cordeiro and Vieira (2012) about the barriers to innovation in SME's. They found that many barriers to innovation faced by the participants, such as the current economic climate, the limitation of monetary resources, the reduced risk-taking culture, the mechanical performances, the routine and cemented processes to change, and the high costs. Some factors born outside the firm are considered more difficult to overcome and the more important barriers that firms face, companies consider themselves not to be very innovative, that they essentially face internal and external barriers

Obstacles to innovation faced by French manufacturing firms has been investigated by Galia and Legros (2004). The paper used the data from the second French community Innovation Survey CHS2. It focuses on obstacles in the postponed projects and abandoned projects. Possible interrelationships and commentaries between obstacles to innovation are studied as well. The findings of this study shows that the firms postponing projects are more prone to face obstacles linked to economic risk, lack of skilled personnel, innovation costs, lack of customer responsiveness, lack of information on technologies and organizational rigidities, whereas firms that abandoned projects tend to more subject to economic barriers than to organizational ones .

The impact of hampering innovation factors on innovation performance for European countries were studied by Sipos et al. (2013). They analyze the impact of hampering innovation factors on innovative performance both within innovative and non-innovative factors. Second, grouping the European surveyed countries in four main categories, pointing out the countries' innovative performance perspectives. The study identifying the correlation between each of the important factors of hampering innovation activities, such as lack of information on markets ,technology and qualified personnel, markets dominated by established enterprises, and the difficulty in finding cooperation partners. the study reveals that for innovative companies there is a very strong negative correlation between the lack of information on markets and the innovative performance, the lack of information on technology affected the innovation activities, markets dominated by established companies was a highly important hampering innovation factors only for a relative small share of innovative companies belonging to countries with high innovative performance, a larger share of innovative companies from countries with weaker innovative performance blamed the difficulty in finding cooperation partners for innovation as being a highly important factor of hampering their innovation activities, and in the innovative enterprises' case, the innovative performances obtained were influenced by the lack of qualified personnel. Karahan and Karhan (2013) are tried to determine the activities of Turkish entrepreneur in making innovation, improving new product and process and using new technologies and obstacles that they come across. The effects of innovation and the factors that prevent firms to implements the innovations are explained in the study. It reveals that the most important tools for innovation are research-development activities, industrial sector is more advanced than the service sector and innovations in the industrial sector both in the service sector were mostly made in product innovations.

Hadjimanolis (1999) conducted a study concentrates on the barriers to innovation in less developed countries. A cross-sectional approach was used to determine any variations in innovation performance and characteristics caused by industrial sector specific factors. Five industrial sectors were chosen, a questionnaire and interviews for the questionnaire completion were conducted. Internal and external variables were included in the study. The study has revealed a number of barriers to innovation as perceived by the managers, also some weakness in the socioeconomic context; such as financing new product development or local construction of machinery, shortage of specialized technical labor and weakness in the supply of technical services. Athanasios and Dickson (2001) also analyze the concept national innovation policy (NIP) and puts forward arguments supporting the need for a NIP for small developing countries like Cyprus. A large purposive sample of 140 Cypriot firms was compiled for a survey of owner/managers' attitudes toward NIP, a cross-sectional approach was used with five industrial sectors chosen. The study founds an ambivalent attitude towards NIP and inefficiency in design and implementation of innovation policy measures

In Palestine, there is no considered literature about innovation, only some reports and short articles published by private firms and non-government organizations which describe the reality and challenges of innovation in the Palestinian areas. For example, Mercy Corps (2013) mentioned that the uniqueness of the Palestinian context creates a challenge for innovation development, reflecting from the developing countries obstacles, it also emphasizes that the affordability and accessibility to the technical skills required for the innovation development and R&D considered a main cause for the lack of these skills and expertise. Another report developed by solution for development consulting for PITA (2012) mentioned that the main obstacles to sectoral growth of ICT sector in Palestine was the low market demand and lack of skills required for new product development, the weak ecosystem for entrepreneurs and innovation, limited access to external markets and small domestic market, and limited access to finance.

2. Nature of KIBS sector and its innovation performance

KIBS sector are classified into 14 activities (see table 1 below). Here is a short description about each of them. The computer networking and the computer software and programs fields are considered part of the ICT sector which is a significant growing sector and have a great potential, it includes about 13% of firms in KIBS. Table 1 shows that 43 of the survived companies reported working in computers software and programming which represent 16.7% from the total KIBS firms, knowing that some of the firms could be working in programing and software and provide network services as well. Telecommunication includes 20 firms (7.6%), and mainly includes the landlines and internet providers. where Management consultant includes 24 firms (9.1%), and includes companies providing management solutions, research and assessments. Accounting and bookkeeping and other financial services, where 3.8% and 1.5% of the companies, respectively reported providing these services, some companies would provide these two services together. Building services and technical engineering service and design are also considered an overlapped sector where 15.6% and 16%, respectively, of the surveyed companies reported providing these services. 7 firms reported working in the legal services, and only 2% of the KIBS firms were provided the temporary labour recruitments, depending on the limited availability of this field. While only one company reported working in environmental services due to the limitation of this field. Around 5% of firms were providing the R&D services which is considered a great percentage to study as a source of innovation. Almost 13% of firms were providing marketing and advertising services and this is also a great potential sector to assess. In addition to 12.5% of the companies are providing training services, this might also overlap with the management consultant somehow, but still have a great potential to unlock their innovation

Table 1: The classification of KIBS firms in Palestine

KIBS areas	Number of firms	percentage
Computer networks/telematics (e.g. on-line databases)	34	12.9
Computer Software & Programs	43	16.3
Telecommunications	20	7.6
Management Consultancy	24	9.1

Accounting and bookkeeping	10	3.8
Building services	41	15.6
Technical engineering service & Design	44	16.7
Temporary labour recruitment services ⁵	5	1.9
Legal services	7	2.7
Environmental services	1	0.4
Financial services (e.g. securities and stock-market-related activities);	4	1.5
R&D Consultancy and "high-tech boutiques"	14	5.3
Marketing/advertising	34	12.9
Training centers	33	12.5

Table 2 shows the innovation output (product, process, marketing, organizational) for the 14 KIBS subsectors. Regarding technological innovation (product and process innovation), we find that telecommunication and technical engineering service & Design firms are the most innovative. This might be explained by the high financial and technical capabilities of these firms, and the availability of skills and technologies needed for such innovation. The innovation capabilities of marketing and advertising firms are consistent with the simple nature of product innovation in this sector. Firms in accounting and bookkeeping, labor requirement services, legal services, environmental service, R&D services, and training sector have no technological innovation output. These sectors are considered new and very small sectors with low employment of knowledge and technology.

Computer networks/telematics, computer software & programs, and marketing sectors perform better than other KIBS sectors in regards with non-technological innovation (marketing and organizational innovation). This might be explained by the low cost and the non-technical competences and skills that required for such innovation. Also, the workers in computer sector (software, hardware, and networks) are considered high skills labor with high level of knowledge and competences. Similar to technological innovation, most of firms in accounting and bookkeeping, labor requirement services, legal services, environmental service, R&D services, and training sector never implement marketing and organizational innovation in 2014 and 2015.

Table 2: innovation performance of KIBS firms

KIBS activities	Number of firms			
	Product innovation	Process innovation	Marketing innovation	Organizational innovation
Computer networks/telematics (e.g. on-line databases)	1	1	16	10
Computer Software & Programs	1	1	12	6
Telecommunications	3	3	9	5
Management Consultancy	1	1	2	2
Accounting and bookkeeping	0	0	1	0
Building services	2	1	2	2
Technical engineering service & Design	6	3	2	3
Temporary labour recruitment services	0	0	0	0
Legal services	0	0	0	0
Environmental services	0	0	0	0
Financial services (e.g. securities and stock-market-related activities);	0	0	0	0
R&D Consultancy and "high-tech boutiques"	0	0	2	1
Marketing/advertising	3	3	10	8
Training centers	0	0	0	0

3. Empirical model, data and estimation method

As we mentioned earlier, we will use the data about innovation and obstacles of innovation in KIBS in Palestine in order to explore the impact of innovation obstacles on the ability of firms to introduce four types of innovations (product, process, organizational and market innovation). We will take into account the fact that obstacles of innovation are divided into three set of factors: demand, knowledge and cost factors. Before we estimate the impact of obstacles of innovation on innovation capabilities, we will provide a descriptive view of the data set and the survey characteristics, and some descriptive statistics about the dependent and independent variables used in the model.

3.1 data

The data was collected using a survey for 400 firms in KIBS sector from a total of 1500 KIBS firms in Palestine, with a response rate of about 65% or 263 firms. The sample was geographically limited with firms in West Bank and not in Gaza strip and Jerusalem due to the constraints imposed by Israel on implementing survey in Jerusalem and the Siege imposed against GAZA which is limiting the data collecting from Gaza. Also the reality of KIBS in Gaza is very poor due to 10 years of siege and three successive wars. The firms were surveyed about their innovation behavior in both 2014 and 2015.

3.2 Dependent variable

Our goal is to measure the effect of hampers of innovation on the ability of firms to introduce innovation. Obstacles of innovation therefore will be our independent variable, and innovation output is the dependent variable. We use the innovation output index where a firm's innovation output is represented by four dummy variables. Each of these variables is equal to one if the firm introduced a product, process, market or organizational innovation. This taxonomy of innovation output is based on the classification of innovation output used in the community innovation survey (CIS) which measures the performance of innovation in European countries, Norway and Iceland.

Table 3 shows the percentage of firms introducing different types of innovation. We find a very weak innovation performance in KIBS firms in Palestine, where only 15 firms from 263 (5.3%) introduce product innovation, 10 firms (3.8%) introduce process innovation, 38 (14.4%) introduce marketing innovation and 25 firms (9.5%) introduce organizational innovation. This reflects the reality of business firms in Palestine which are mainly small firms less than 10 employees and having low ability to introduce new services.

We find that non-technological innovation (marketing and organizational innovation) has the highest score for innovation performance. This is consistent with the fact that non-technological activities are the most important innovation activities in services generally and KIBS basically.

Also, the low cost of marketing and organizational innovation in comparison with other types of innovation.

Table 3: innovation output in KIBS firms in 2014, 2015

	Number of firms	Percentage
Product innovation	14	5.3%
Process innovation	10	3.8%
Marketing innovation	38	14.4%
Organizational innovation	25	9.5%

3.3 Independent variable

Obstacles of innovation are our main independent variable. They are divided into three factors: cost factor, knowledge factor and demand factor, where each factor includes a set of indicators (see table 4 below). Table 4 shows that knowledge factor represented by technology infrastructure (62%) and knowledge base (62%) are the most important hampers of innovation in Palestine, this might be explained by the weak of technology infrastructure and the very small size of ICT sector and very low investment in this sector due to the political situation in the Palestinian areas. Cost factor represented by the high cost of innovation (61%) and lack of fund from outside the firm (60.1%) are also among the most important hampers of innovation. This might be explained by the fact that most of KIBS firms (more than 85%) in Palestine are considered small firms employ less than 20 employees (see table below) and might not be able to provide or to allocate money for innovation. Most of the firms denote that many of the innovative KIBS are not exist in the market (only 27% find that no need for innovation due to prior innovations is considered an obstacle for innovation).

Table 4: obstacles of innovation in KIBS in Palestine in 2014, 2015

Obstacles of innovation		
Cost factor	Lack of funds within your enterprise	35%
	Lack of finance from sources outside your enterprise	60.1%
	Innovation costs too high	61%
Knowledge factor	Lack of qualified personnel	33.5%
	Lack of information on technology	36.9%
	Lack of information on markets	36.1%
	Lack of technology infrastructure in Palestine	62%
	Lack of knowledge base in Palestine	62%
	Difficulty in finding cooperation partners for innovation	53%
Demand factor	No need due to prior innovations	27.8%
	Weak of competition	57%
	Uncertain demand for innovative goods or services	55%

In addition to obstacles, the model includes a certain number of control variables: age of firm, firm size, and if firm export or not. Firm size is considered one of the key control factors, and it is measured by number of workers. As we have mentioned previously, table 5 below shows that around 85.2% of firms employ less than 20 employees, while only less than 1% employ more than 100 of employees. This definitely shows that Palestinian KIBS sector is considered small or medium sector. Most of empirical studies find a positive relationship between firm size and innovation performance.

Table 5: Number of workers in KIBS in Palestine

Number of workers	Frequency	Percent
1- 20	224	85.2
21- 50	21	8.0
51- 100	16	6.1
More than 100	2	.8

Firm age is another control variable which might affect innovation performance of KIBS. Old firms might have more experience and market share that might reflect on the financial capabilities and so innovation. Data shows that only 20% of KIBS was existing before Oslo agreement in 1993 which means that KIBS in Palestine is considered a modern sector. The last control variable is the export. Firms which export there services might have more ability and propensity to innovate due to high competition in international market and also the fluctuation of revenues from out of Palestinian market.

3. Discussion of the results of the empirical analysis

In this section we present and discuss the results of our empirical investigation, i.e. the impact of innovation obstacles on the innovation performance of KIBS firms in Palestine. Binary choice logit model is employed to estimate the relationship. Model is run separately for every dependent variable (product, process, Organizational and marketing). Each of dependent variable has two possibilities; to innovate or not.

Table 6 presents the results of model estimation. It shows that in case of product innovation, cost factor is the most important obstacles of innovation, which support what we have mentioned previously that more than 60% of KIBS firms in Palestine find that high innovation cost and lack of external fund are limiting their innovation capabilities or hamper them to do innovation.

Demand factors represented by weak of completion and uncertain demand for innovative products are negatively impact the ability of firm to do innovation. This is might be embedded to the uncertainty generally exist in the Palestinian economic due to the political instability and high fluctuation in income and employment. More than 200 thousands public employees haven't receive their salaries along six months in 2014 because of the punishments Israel imposed against Palestine by not transferring the tariff taxes which they collect in behalf of the Palestinian side as signed in Paris agreement the economic part of Oslo agreement.

A similar result for process innovation is obtained. Cost factor is the most hamper of process innovation followed by demand factor. This confirms what we have mentioned previously that demand for technological innovation (product and process innovation) is low due to high related cost, mainly high percentage of Palestinian new services are coming through imports, mainly from Israel (According to Palestinian central bureau of statistics around 80% of Palestinian imports come through Israel) which considered costly regarding to the low income and high ratio of unemployment in Palestine in comparison with that in Israel, which meanwhile negatively affect the demand for product and process innovation.

Knowledge factor is not significant as a hamper of innovation in both product and process innovation. This might be explained by the low ratio of product and process innovation in KIBS firms and so the decrease of demand for related knowledge and technologies. Also, service sector in Palestine is still considered new and new product development is growing slowly. The significantly of knowledge factor in marketing and organizational innovation confirms this result.

None of the control variables has significant impact on product and process innovation. This might be justified for the age variable knowing that most of KIBS are considered new as we have mentioned previously, so there is no age advantage might be present in case of product and process innovation. Data shows that only two firms among the KIBS firms established before 1993 have product innovation. Large firms have no advantage on small firms regarding product and process innovation. This result contradicts many of the studies which significant and positive advantage for large firms regarding innovation. The insignificant impact of export on product innovation might be explained by the low ratio of exports in KIBS sector, only 14% of KIBS

export their products, and only 1% of exporting firms (only 3 firms) have product innovation, and less than 1% of exporting firms (only one firm) have process innovation.

Regarding marketing and organizational innovation, table 6 shows a negative impact for both cost and demand factor, where cost factor seems to be more hampering innovation in comparison with demand factor. While, knowledge factor indicate an unexpected result through its positive impact the innovation capabilities of KIBS firms. This might be explained by what Tourigny and Le (2004) found that obstacles of innovation indicate how successfully a firm can overcome these obstacles. In other words, the lack of knowledge base and technology infrastructure in Palestine, lack of qualified personnel and information on technology push firms to overcome these obstacles by finding innovative solutions for their marketing practices. Also, non-technological innovation (marketing and organizational innovation) in Palestine does not require heavy technologies or high developed knowledge and technology infrastructure. It depends mainly on using some new skills and experiences that might be obtained by simple and low cost tools and approaches.

Table 6: The impact of obstacles of innovation on innovation activities in KIBS firms

	Dependent variable			
	Product innovation	Process innovation	Marketing innovation	Organizational innovation
Cost factor	-2.149**	-2.31*	-2.249***	-1.94**
Knowledge factor	-1.35	-1.77	3.75***	2.89**
Demand factor	-0.857**	-0.789*	-0.685**	-0.84**
Size	0.76	0.892	1.76**	1.93**
Ln(age)	-0.361	-0.835	-0.303	-0.66*
Export	0.728	-0.408	-0.334	-1.54
Constant	-1.615	-0.327	-4.56**	-1.69
Nagelkerke R ²	0.166	0.185	0.219	0.201

Ominibus test	14.5**	15.3**	30.6***	22.7***
N	263	263	263	263

sig at 0.01 ***

sig at 0.05**

sig at 0.10*

Regarding control variables, we find that firm size positively impact marketing and organizational innovation. This is consistent with literatures which stress that large firms are more able to produce new innovation output. In Palestine large firms in KIBS are mainly represented by telecommunication companies (PalTel and Wataniyya), and some IT firms, which has more capabilities in innovating new marketing solutions and new strategies, plans and administrative competences. Old firms has disadvantage in organizational innovation, which might be explained by the novelty of KIBS sector and most of innovative firms in telecommunication and IT are modern firm instituted after Oslo agreement and establishment of Palestinian authority.

Conclusion

In view of the limited previous researches and the analysis of the result generated through this study, there is a significant association between innovation performance and the obstacles of innovation the firm may face. This study find an evidence that the obstacles are hampering the innovation in different levels, considering the different types of innovation that was assessed in this study, the cost factor (includes lack of funds and lack of finance from outside the firm and the high innovation cost) is the factor with the greatest negative impact on the product and process innovation as well as the organizational and marketing innovation, followed by the demand factor which was reflected by the weak competition and uncertainty and impact of the prior innovation. On the other hand the knowledge factor had a positive impact in number of firm focusing on organizational and marketing innovation which were able to overcome it and address it.

Knowing the complexity of the Palestinian context and the potential of innovation in the Palestinian economy, different actors can unlock this potential and contribute to the innovation development in Palestine:

- 1) The Palestinian authority could create a better enabling environment through facilitating the importing of innovation from foreign countries and also encourage the companies for more innovation through incentives and more safe space with minimal risks from their side
- 2) The Palestinian authority could also contribute to minimize the cost factor impact on the organizations by facilitating better infrastructure and invest more in the research and provide support or incentives for innovative firms, in addition to that more private public partnerships could have greater impact on different levels.
- 3) The firms could also invest in non-technological innovation with longer term change, like market and organizational which will have impact on the product and process innovation on the longer-term
- 4) Firms could benchmark innovation from other semi-cultural firms with similar context, in addition to that creating the demand for innovation as possible.
- 5) Firms could create partnership for technological innovation that could minimize the risk and maximize the impact.
- 6) Creating the awareness about the innovation contribution to the organizational performance and economy will attract the investors and different actors to address the challenges and tackle these obstacles.

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**Sustainable business models in service? A study of Norwegian knowledge-intensive
service companies**

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Sustainable business models in service? A study of Norwegian knowledge-intensive service companies

Abstract

Sustainability is considered one of the main drivers of innovation in the contemporary economy. While service companies dominate contemporary economies, they are often seen as lacking in awareness and action towards sustainability concerns. The aim of this study is to investigate current practices concerning and attitudes towards sustainability and business model innovations for sustainability in Norwegian knowledge-intensive service sector firms.

We conduct a survey of 103 such companies and provide insight into their motives for sustainability work, the sustainability-related changes they make to their business models, as well as how they perceive the influence of these practices on their performance along financial, social and environmental performance dimensions. Our study suggests that while the companies that manage to reap direct or indirect financial benefits from sustainability work do not engage more comprehensively in terms of resource use, but that they make more changes both in products, services and procedure, as well as in their relationships to key stakeholders. Our study thus contributes to the understanding of sustainability practices in service companies, as well as to the relationship between sustainability performance and financial performance in such companies.

Key words:

Business model innovation; Service; Sustainability

Sustainable business models in service? A study of Norwegian knowledge-intensive service companies

Introduction

Sustainability is considered one of the main drivers of innovation in the contemporary economy (Nidumolu et al., 2009). Practitioners are to an increasing degree becoming aware of the potential inherent making sustainability a part of their core activities through business model innovations (Eccles & Serafeim, 2013; Wells, 2013; Boons & Lüdeke-Freund, 2013). Concurrently, business researchers are making an increasingly strong case for the business potential of such sustainable business models, through both conceptual work (Jørgensen & Pedersen, 2015; Porter & Kramer, 2011) and empirical contributions (Eccles et al., 2014; Kiron et al., 2012; Khan et al., 2015).

Service companies dominate today's economies – the service sector constitutes a larger proportion of the value-added in the world than goods-producing industries.¹ Given this, service providers will need to play a key role in the quest for sustainable societies. However, the economic dominance apparently does not translate into leadership in the race towards a more sustainable future: While both practice of and research on sustainability efforts in goods-producing industries are abundant, this does not appear to be the case for service providers (Gulbrandsen et al., 2015, Bocken et al., 2014; Kiron et al., 2012). More knowledge of sustainability initiatives within the service sector is therefore highly sought-after.

The aim of this study is to investigate current practices concerning and attitudes towards sustainability and business model innovations for sustainability in Norwegian knowledge-intensive service sector firms. Survey-data collected from a sample of 103 Norwegian knowledge-intensive service companies provide insights into companies' motives for engaging in sustainability, the concrete measures introduced by companies, the companies' judgment of their own success (both in terms of financial return on investments in sustainability, and in terms of positive environmental and social effects), and their intentions for future investments in sustainability. The paper thus gives insight into the prevalence and

¹ In 2013 the world average value-added of the service sector in a nation's GDP was 58.1 percent (World Bank, 2015). The share is even higher in the developed countries.

characteristics of business model adaptations and innovations, and how they relate to strategic leadership (Strand, 2014) and organizational design (Birkinshaw et al., 2014).

Our results indicate a clear pattern as to which companies report positive financial effects from their sustainability efforts. We find that such “harvester”² companies are more likely to (1) anchor their sustainability measures in organizational support systems, (2) make substantial changes to services and processes, and/or to their relationships with stakeholders, (3) use resources right, rather than use more resources, and (4) have a coherent system of sustainability work, from strategy to control and reporting. Furthermore, we find evidence in our sample that service companies are planning to increase their investments in sustainability – this implies that current competitive advantages may become tomorrow’s hygiene factors.

The contribution of our study is mainly descriptive, in the sense that we give an overview of the current state of affairs concerning sustainability and business models innovations for sustainability among service providers. Given the patterns we identify, there is a potential prescriptive element as well – we provide knowledge from successful early adopters of sustainability. This knowledge may be used by practitioners and researchers to guide the management of sustainability challenges and opportunities among service providers.

Theoretical framework and existing research

Any company has a business model that can be described as “the story of how the business exploits business opportunities to create, deliver, and capture value” (Jørgensen and Pedersen, 2013). A business model is thus, in short, the conceptual framework for how the company seeks to create profitability, by exploiting business opportunities that allow the firm to offer and deliver value to customers at a price that leaves the business with an acceptable profit (Zott et al., 2011; Johnson, 2010).

Increasingly, sustainability concerns are becoming integrated into companies business models, as they attempt to pursue sustainability-related objectives while at the same time attaining profits. Several authors have explored the ways in which these two goals may be aligned, and in fact even reinforce each other (e.g. Porter and Kramer, 2011; Eccles &

² The term is taken from Kiron et al. (2012).

Serafeim, 2013; Jørgensen and Pedersen, 2015). Any business model has externalities, which implies that all companies have positive and negative side-effects that leave either a positive or a negative footprint on society and the environment (cf. Laffont 2008). By designing business models that have a better net footprint than competitors, companies can cater to the preferences of customers, employees, investors and other stakeholders who may value such characteristics of the company and its brand. As described above, this may entail (1) designing value propositions that enable consumers to lead more sustainable lifestyles (B2C) or enable other companies to reduce their ecological footprint (B2B), or (2) delivering these value propositions in ways that are more sustainable (Gulbrandsen et al., 2015).

In the existing research on companies that innovate for sustainability, the potential for aligning financial performance and sustainability performance is emphasized. Eccles et al. (2014) find that companies that are denoted as “high sustainability firms” outperform so-called “low sustainability firms” financially. High sustainability firms are characterized by anchoring sustainability at board and executive levels; dedicated strategies for sustainability and customized KPIs to measure sustainability performance; long-term horizons; high prevalence of sustainability reporting, and so on.

In a large-scale global survey of CEOs, Kiron et al. (2012) find that there is a distinct group of business organizations – «harvesters» – that manage to capture value from investing in sustainability. Harvesters have typically made significant changes to goal structures, organizational design and so on, in order to promote sustainability performance, and they self-report that they reap financial benefit from making such changes.

In a study of sustainability performance, Khan et al. (2015) reveal a relationship between the materiality of sustainability concerns addressed by companies, and their ability to reap financial gain from such investments. Companies that invest in tackling material sustainability concerns outperform those that do not. They also outperform companies that both invest in material and immaterial sustainability concerns. This shows that the financial benefit of investing in sustainability depends on investing in the right measures, rather than the comprehensiveness of the sustainability measures.

These prior studies provide valuable insight into how financial performance and sustainability performance are related, as well as into the characteristics of companies that are able to align

these two performance dimensions. However, while these studies shed light on the characteristics of companies that are performing well along both performance dimensions, they to a lesser extent illuminate the changes companies are making in order to attain such objectives. In this study, we therefore investigate companies making changes to their business models in ways that are relevant to their sustainability performance. We investigate such business model adaptations and innovations and aim to shed light on how they relate to their financial performance, as seen by the companies themselves.

Method

In order to capture the prevalence and nature of business model adaptations and innovations for sustainability among service companies, we designed a comprehensive survey. The survey was distributed to a sample of knowledge-intensive service companies that are members of the Norwegian trade and employers association *Abelia*³. *Abelia* is associated with Norway's largest employers' organization; the NHO (Confederation of Norwegian Business and Industry). *Abelia* is a non-profit and non-political organization funded by its more than 1650 member companies.

We conducted the survey in the spring of 2014, and data was collected using an online survey instrument. *Abelia* distributed the survey on our behalf, and sent a reminder to non-responders, which is likely to have improved our response rate. The study population is Norwegian service firms, and the study sample consisted of 360 *Abelia* member companies. 103 companies completed the survey (we elaborate on the sample in the Results section below).

The survey consisted of 87 items, some of which were Likert scales and some of which were open-ended questions where respondents could write their own responses. The survey comprised the following categories of questions: (1) general information about the company, including information about finances, organization and governance; (2) the company's sustainability-related commitments, such as employees, strategies, principles, etc.; (3) the company's views on sustainability and their motives for engaging in sustainability work; (4) business model changes related to sustainability concerns; (5) the company's views on the

³ For information about *Abelia*, see www.abelia.no.

effects of this work, both for the company itself and for its stakeholders; and (6) the company's expectation about sustainability in the future, and their own work in that regard.

The descriptive information about the companies allow us to compare and control for differences in company characteristics such as size, financial performance, the number of female members of the top management team, and so on. The open-ended questions were intended to allow respondents to bring forward relevant information that was not captured by our survey questions. The remainder of the survey questions were designed to capture central constructs of theoretical interest, including the company's motivation for investing in sustainability work, the nature and characteristics of the changes made to the company's business model in relation to sustainability concerns, as well as the sustainability performance of the company.

Measures

The survey comprises a number of single items that capture specific characteristics of the companies' work with sustainability. These items are all based on a 5 point Likert scale from "Completely agree" to "Completely disagree". Examples of such items are "*We dedicate a lot of resources to working with sustainability*" and "*Our customers view us as a responsible company*". Table 1 summarizes the items that relate to the various constructs that we aimed to capture in the survey. For each of the categories, we have listed the items used, as well as whether they are continuous or categorical variables.

[Insert Table 1 here]

As will be described in the results section, we conducted factor analyses for (1) the items intended to capture motives for investing in sustainability and (2) the items intended to capture sustainability-related changes made to the business model. For the items related to the effects of sustainability measures both for the company itself and for stakeholders, we used simple sum scores of the associated items. These analyses are described further in the results section.

Results

In this section, we present our results. First, we outline descriptive statistics of the sample. Second, we conduct factor analyses to reveal underlying dimensions of some of the key constructs. Third, we introduce a distinction between companies that attain benefit from investing in sustainability and those that do not. On this basis, we compare the two groups of companies along the key dimensions of the survey. Finally, we conduct a multiple regression to investigate if our results hold when controlling for relevant factors.

Study sample and descriptive statistics

Our survey was distributed to 360 companies that are members of the trade association Abelia. 103 companies responded to the survey, which gives a response rate of 29%. 87% of respondents were managers. 69% of respondents were male. In our sample, 67% of the companies were primarily business-to-business companies.

A variety of industries were included in the sample. The three biggest industries among the respondents were the following: R&D and teaching companies, which represent approximately 30% of the sample; consultancy companies, which represent approximately 15% of the sample; and IT and telecommunications companies, which represent approximately 10% of the sample.

Figure 1 shows which concrete organizational measures have been put in place in order to promote sustainability work in the companies. As shown in the figure, 24.3% of the companies have a dedicated employee working on sustainability; 8.7% of the companies have a dedicated unit working on such issues; 26.2% have committed to the UN Global Compact principles; 48.5% have a dedicated strategy for sustainability; 19.4% have KPIs for sustainability performance; 8.7% have financial incentives tied to sustainability performance; and 29% report on sustainability performance in an external report.

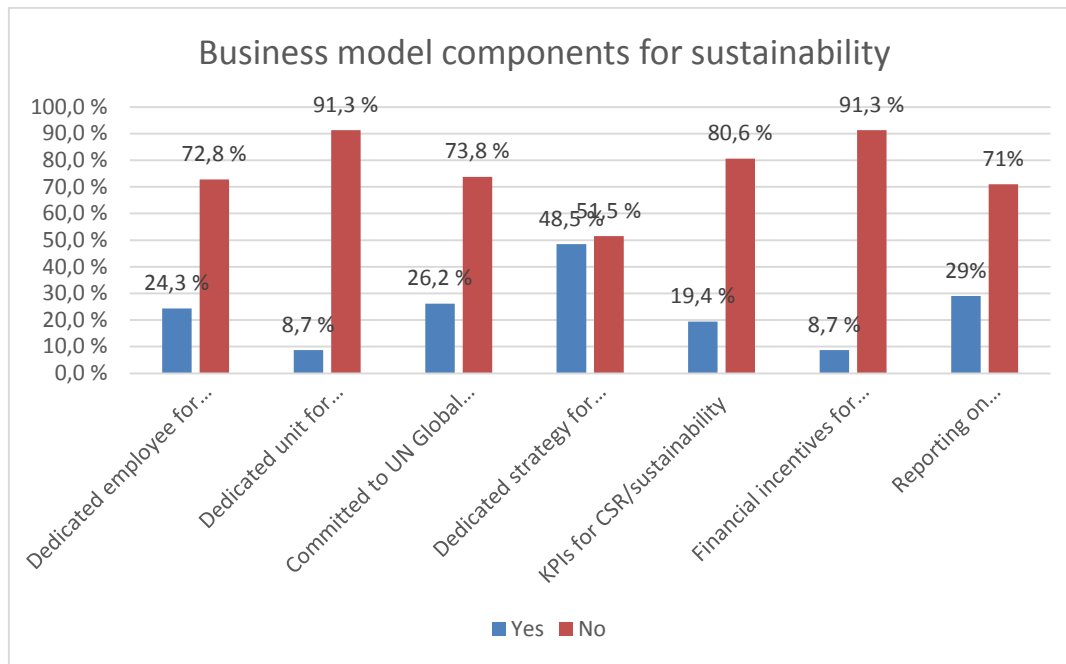


Figure 1: Business model components for sustainability

Factor analyses

In order to reveal underlying dimensions of some of our key constructs, we conducted factor analyses on the items that reflected (1) motives for investing in sustainability, and (2) the changes made in the business models of the companies. Table 2 shows the factor analysis of items reflecting motives for investing in sustainability, and includes both the pattern and structure coefficients.

[Insert Table 2 here]

As shown in Table 2, three factors were extracted. The first factor includes six items associated with various market-related benefits for the company both related to product and factor markets. The factor includes motives such as improved reputation, attending to customers' needs, building legitimacy and attracting employees. We label this factor "market benefits". The second factor includes three items that capture characteristics of the company that relate to governance or management control. The items reflect risk management, cost reduction and adaptations to resource scarcity. We label this factor "governance". The third

factor includes three items that capture pressures from important stakeholders in the form of owners, competitors and collaborators. We label this factor “external pressure”.

Table 3 similarly shows the factor analysis of items reflecting changes made to the business models in order to promote sustainability. Two factors were extracted. The first factor comprises five items reflecting changes made to product or service offerings, work processes and input factors. We label this factor “internal changes”. The second factor comprises four items reflecting changes in the relationship to external stakeholders. We label this factor “relational changes”.

[Insert Table 3 here]

Comparisons between harvesters and non-harvesters

In order to investigate the difference between companies that report to reap financial benefit from their investments in sustainability and those that do not, we calculate a sum score. In the survey, the following items capture the ways sustainability measures positively influence the performance of the company: (1) sustainability measures may reduce costs, (2) sustainability measures may reduce risk, (3) sustainability measures may provide new business opportunities, (4) sustainability measures may make employees more committed and/or motivated, (5) sustainability measures may impact the value of the firm, (6) sustainability measures may positively influence corporate reputation. Each of these items were scored on 7 point Likert scales from “Completely agree” to “Completely disagree”. For the sum score, these were scored as 7 and 1, respectively, which implies that the sum score for each company ranged from 6 to 42. In our analyses, the “harvesters” are the companies that have a sum score higher than 29.

In Figure 2, we show the difference in the degree to which harvesters and non-harvesters⁴ have adopted the various business model components for sustainability that we described for the full sample in Figure 1 above. As the figure shows, the harvesters have overall adopted more of these organizational characteristics. All differences are statistically significant

⁴ We use the distinction between harvesters and non-harvesters, as introduced by Kiron et al (2012).

($p < 0.05$), except the differences in the use of financial incentives and the reporting of sustainability performance.

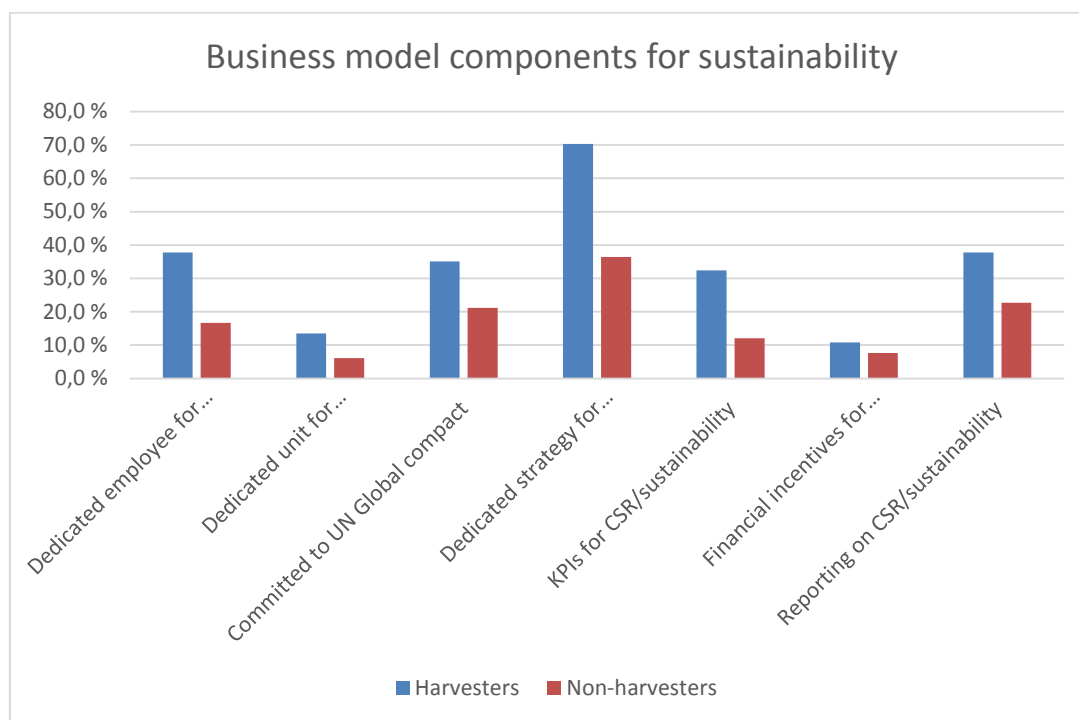


Figure 2: Comparison of business model components for sustainability between harvesters and non-harvesters

In Figure 3, we compare the changes made to business models for each of the two factors that were found in the factor analysis above. In order to compare the two factors, we use the sum score for the items associated with each factor. As shown in Figure 3, harvesters make more changes both to products, services and processes (the “internal changes” factor) and in relationships to stakeholders (the “relational changes” factor). Both differences are statistically significant ($p > 0.001$).

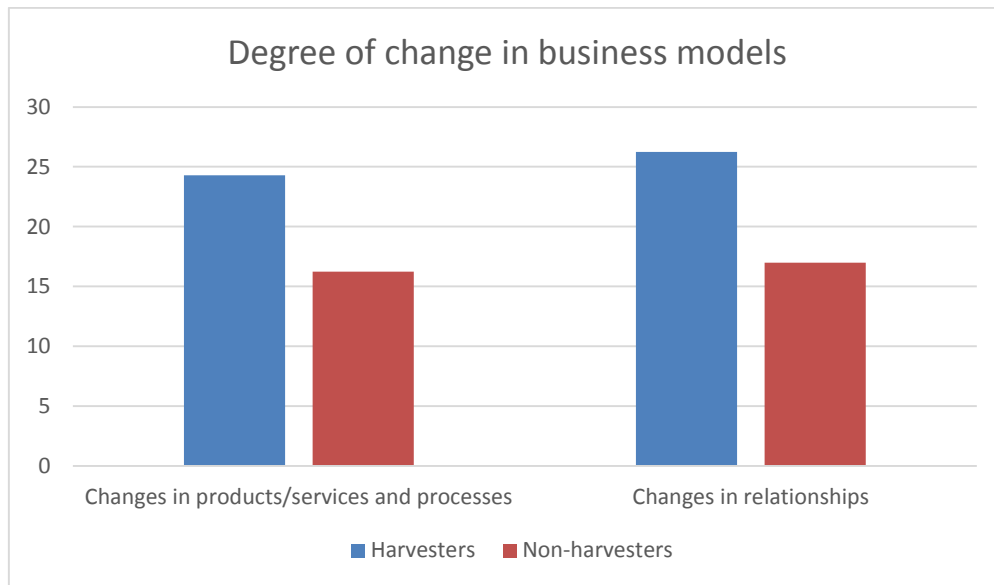


Figure 3: Comparison of the degree of business model change between harvesters and non-harvesters

In Figure 4, we similarly compare the harvesters and non-harvesters with regard to their assessment of the effects of their changes on their sustainability performance. Three effects are considered: (1) the degree to which the company's sustainability work improves their environmental performance, (2) the degree to which the company's sustainability work improves their social performance, and (3) the degree to which the company's sustainability work improves their stakeholder engagement. For all three outcomes, harvesters report a bigger effect of their sustainability work. The differences are all statistically significant ($p > 0.001$).

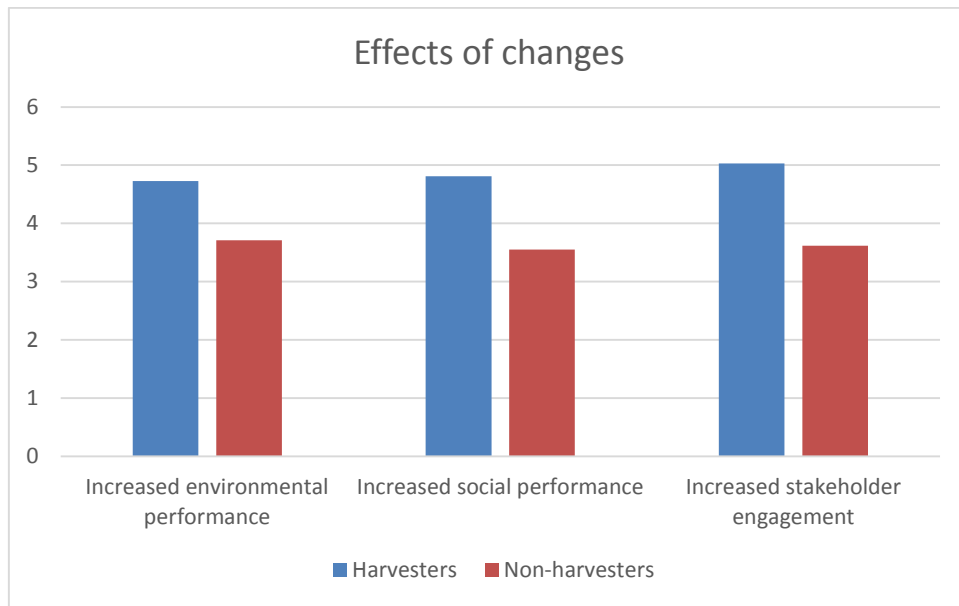


Figure 4: Comparison of social and environmental goal attainment between harvesters and non-harvesters

In Figure 5, we compare the harvesters and non-harvesters with regard to their expectations about how sustainability will impact their business in the future. Four issues are considered: (1) whether or not sustainability work will be a more extensive part of their company in the future, (2) the degree to which sustainability performance will impact their profitability, (3) whether or not there will be more governmental regulations and incentives related to sustainability performance, and (4) the degree to which sustainability work will be a source of competitive advantage. For all four issues, harvesters have bigger expectations of the importance of these issues in the future. The differences are all statistically significant ($p > 0.001$).

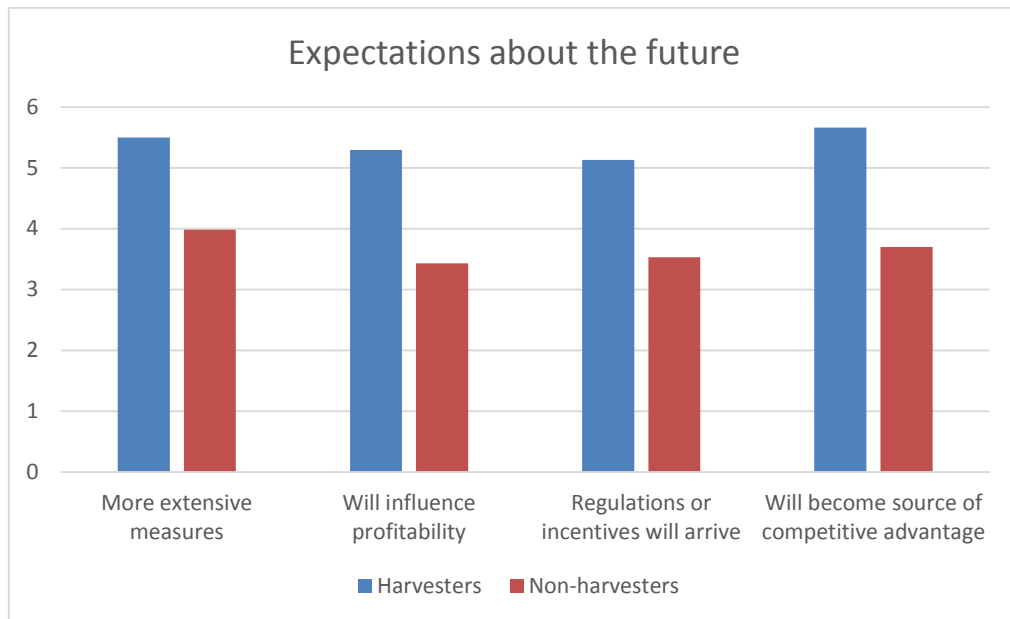


Figure 5: Comparison about expectations about the future between harvesters and non-harvesters

Multiple regression

Finally, we conducted a multiple regression in order to investigate the characteristics that distinguish harvesters from non-harvesters in our sample. The dependent variable is the sumscore for harvesting, i.e. the sum of the scores for the items that indicate that the company's sustainability work has led to: (1) reduced cost, (2) reduced risk, (3) new business opportunities, (4) higher value of the company, (5) more motivated and/or committed employees, and (6) improved corporate reputation.

The independent variables were as follows: (1) the three motivation factors from the factor analysis, (2) the two business model change factors from the factor analysis, (3) the level of resource allocation to sustainability, (4) dummy variables for each of the business model components for sustainability.

[To the reviewers: The presentation of this part of the analysis is still incomplete, but will be completed prior to the RESER conference. Generally, the multiple regression shows that most of the relationships explored above still hold when these variables are investigated

simultaneously. We apologize for failing to finish this part of the analysis in time for the deadline]

Discussion and conclusion

This study has aimed to investigate current practices concerning and attitudes towards sustainability as well as business model innovations for sustainability in Norwegian knowledge-intensive service sector firms. Based on a survey of 103 knowledge-intensive service companies, we have provided insight into the prevalence of sustainability-related practices, the stated motives for such practices, the types of changes they make to their business models, and the implications thereof for the companies themselves as well as for their stakeholders.

Our study is cross-sectional, which implies that we only provide a snapshot of such practices. However, the companies provide retrospectively oriented information about the motives for their current practices, as well as future-oriented viewpoints on their expectations for sustainability work in the future of their company. Thus, we aim to shed some light also on the dynamics of sustainability work in service companies.

Our study reveals that some of the common sustainability practices seem to be somewhat prevalent in service companies, while the comprehensiveness of such practices seem to be somewhat limited. While almost a half of the companies have a sustainability strategy, almost a third of the companies have sustainability reporting and approximately a fourth of the companies are committed to UN's Global Compact and have a dedicated employee working on sustainability, there are fewer companies that have dedicated KPI's or financial incentives tied to sustainability performance. This suggests that the harvesters among Norwegian service companies share similar characteristics as the harvesters analyzed in the international survey by Kiron et al. (2012).

Interestingly, when we distinguish between companies that self-report to reap financial benefit from their investments in sustainability ("harvesters") and those that do not ("non-harvesters"), we find that the former group is significantly more likely to have introduced these sustainability-related practices, excluding financial incentives and sustainability reporting. There is no significant difference in the degree to which companies report to spend

a lot of resources on sustainability practices, which implies that spending resources in the right way is more important than how much is spent on such practices. This is in line with the findings of Khan et al. (2015).

By means of factor analyses, we revealed underlying dimensions of both the motives for investing in sustainability and the changes made to business models reported by the companies. The factor analysis of companies' motives revealed three main motives: (1) market benefits, which includes direct and indirect financial benefits from sustainability work; (2) governance, which includes risk management and control-related reasons for working with sustainability; and (3) external pressures, which includes various forms of expectations and pressure from key stakeholders to work with sustainability. The factor analysis of business model changes revealed two factors: (1) changes to products, services and processes, and (2) changes in relationships to stakeholders.

When comparing harvesters and non-harvesters, we find that harvesters make more changes along both these dimensions. Moreover, the harvesters report significantly higher expectations that sustainability will be important to the performance of the company in the future. Thus, they signal an intent to invest further in increasing their sustainability performance.

Our study suggests that there are systematic differences in the sustainability practices of service companies, and that these differences are associated with the degree to which the companies experience positive effects on their financial performance following from their sustainability work. Our findings suggest that the motives for investing in sustainability seem to be more strategic than morally motivated, and the changes made to business models are to a large extent tied to characteristics of the companies' core resources and activities. This suggests that sustainability work among service companies is becoming more of a mainstream activity.

The findings of this study should be interpreted prudently, since they build on self-reported data. In particular, the perception of the degree to which sustainability practices lead to direct or indirect financial benefits are difficult for the respondents to properly assess. For this reason, future research should aim to investigate further the relationship between the motives and business model changes revealed in this study on the one hand, and actual measures of financial performance on the other. This could produce more robust findings on how concrete

business model adoptions and innovations influence financial performance. Moreover, further research should delve deeper into the potential differences between service companies and other companies (e.g. in manufacturing etc.), in order to investigate whether the differences in perception of these sectors' attention to sustainability performance is actually present also when it comes to their concrete sustainability practices. Such insights could inform the development of measures within the industries as well as among policy makers.

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Table 1: Constructs/measures and items in the survey

Construct/measure	Items	Type of measure
Business model components for sustainability	<p>Does your company have:</p> <ul style="list-style-type: none"> • A standing commitment to responsibility or sustainability principles, such as UN Global Compact, GRI, or others? • A dedicated strategy for its engagement in responsibility/sustainability? • KPIs (key performance indicators) measuring responsibility/sustainability goal attainment? • Financial incentives (either at the individual level or at business unit level) tied to responsibility/sustainability-related work? • External reports on social and/or environmental performance? (e.g. environmental reporting, integrated report, GRI, or others) 	Categorical (yes/no)
Effects of sustainability measures	<p>We find that our commitment to responsibility/sustainability gives us:</p> <ul style="list-style-type: none"> • A reduced negative impact on the environment (when compared to our own previous impact) • A reduced negative impact on society (when compared to our own previous impact) • Cost reductions for the company • Reduced risk • New business opportunities • A higher level of employee motivation • An increased company price/valuation • More communication with our stakeholders than before • A better reputation 	Likert 7 point
Motives for investing in sustainability	<p>We engage in responsibility/sustainability in order to:</p> <ul style="list-style-type: none"> • Respond to pressure from our business partners • Comply with demands from owners • Adapt to our competitors • Attract or retain good employees • Act in accordance with our own moral beliefs • Adapt to expected future legislation • Gain legitimacy in the society in which we conduct our business • Adapt to future resource scarcity • Achieve cost reductions • Improve company risk management • Improve corporate reputation • Minimize the harmful effects of our activities • Exploit innovation or other business opportunities • Live up to customer expectations 	<u>Likert 7 point</u>
Expectations about future development	<p>Our company expect the following to hold true over the coming years:</p> <ul style="list-style-type: none"> • The company's responsibility/sustainability engagement will become more extensive • The company's responsibility/sustainability engagement will have positive effects on our financial results • Government will introduce new environmentally or socially oriented regulations or incentives in our industry • Responsibility will become a competitive advantage in our industry 	Likert 7 point

Types of business model changes for sustainability	<p>Due to responsibility/sustainability concerns we:</p> <ul style="list-style-type: none"> • Have changed our choice of business partners • Share our profits or our revenues with stakeholders outside the company • Have chosen not to take certain customers • Have chosen new business partners (e.g. subcontractors) • Have opted out of choosing certain suppliers • Are trying to influence our suppliers and business partners • Have changed or differentiated our prices in order to give more customers access to our products/services 	Likert 7 point
Integration of sustainability	<p>Please consider the following statements:</p> <ul style="list-style-type: none"> • Responsibility/sustainability is a natural part of the vision and overarching strategies of our company • There is a high degree of correlation between our external communication regarding responsibility/sustainability and our corporate culture • The company's managers often mention the importance of responsibility/sustainability in their communication with employees 	Likert 7 point

Table 2: Pattern and structure matrix for PCA with Oblimin rotation of three-factor solution for sustainability motives

Items – motives for sustainability	Pattern coefficients			Structure coefficients			Communalities
	Component 1	Component 2	Component 3	Component 1	Component 2	Component 3	
Improving corporate reputation	,680	,158	,098	,784	,451	,450	,649
Exploiting innovation and business opportunities	,693	,157	,035	,769	,435	,392	,615
Expectations from customers	,583	,026	,305	,729	,347	,572	,609
Attract or retain employees	,918	-,031	-,169	,831	,268	,228	,716
Act in line with moral convictions	,890	-,061	-,028	,854	,272	,347	,733
Build legitimacy	,694	-,036	,310	,818	,330	,607	,745
Adapt to future resource scarcity	,074	,777	,076	,406	,830	,356	,702
Achieve cost advantages	-,117	,966	-,038	,237	,909	,217	,841
Improve risk management	,432	,459	-,036	,593	,613	,301	,527
Pressure from collaborators	-,195	,065	,913	,235	,280	,847	,746
Demands from owners	,237	-,076	,544	,449	,188	,625	,432
Adapt to competition	,042	,057	,785	,411	,322	,821	,680

Table 3: Pattern and structure matrix for PCA with Oblimin rotation of three-factor solution for business model changes

Item	Pattern coefficients		Structure coefficients		Communalities
	Component 1	Component 2	Component 1	Component 2	
Changes to products/services	,795	,142	,877	,598	,782
New products/services	,672	,116	,738	,501	,554
Changes in input factors	,897	-,028	,881	,486	,777
Changes in work processes	,834	-,048	,807	,430	,653
Changes for new business opportunities	,897	-,096	,842	,418	,715
Saying no to customers	-,215	,936	,321	,813	,691
Choosing new collaborators	,339	,663	,719	,857	,812
Saying no to suppliers	,117	,786	,567	,853	,736
Changing prices to accomodate new segments	,363	,507	,654	,715	,600

E2: Innovation and development in healthcare

Chair: Doris Schartinger

XXV. International RESER Conference

Social innovation in Austrian health care: concepts and practice

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Abstract

Social innovation (SI) relates to new responses to pressing social demands by means which affect the process of social interactions. This paper has a special focus on social innovation in healthcare. It is a conceptual paper which is aimed at preparing the ground for empirical field work. The guiding question is: Are there patterns observable where social innovations in Austrian healthcare (most likely) occur? The paper follows a threefold approach, based on existing studies and data of Austrian healthcare: First, the view on health care markets, secondly, the view on the health care system, and thirdly, the view on health problems. The methodology proposed in this paper shall provide guidance to comprehensively screen and identify social innovation projects in Austrian healthcare, labelled as social innovations or not.

1. Introduction

The burning question concerning social innovation is if they can (and should) be advanced on the basis of support schemes which overcome the notion that every social innovation project is singularly knit into its constellation of agents, networks and institutional context. Still, if support schemes are necessary they should be recharged from empirical evidence on patterns of barriers and opportunities common in numerous social innovation projects. This requires empirical evidence over a multitude of social innovation projects.

There are a variety of definitions that emphasize differentiated aspects of social innovation. The Bureau of European Policy Advisers defines social innovation (SI) as *relating to new responses to pressing social needs and creating new social relationships or collaborations. Hence, social innovations are innovations that are social in both their ends and their means* (BEPA, 2010).

The SI DRIVE project outlines a comprehensive working definition for the first phase of the project in order to refine it in the course of the project on the basis of empirical evidence. Social innovation is seen as

- a new combination or figuration of practices in areas of social action;
- prompted by certain actors or constellations of actors;
- with the goal of better coping with needs and problems than is possible by use of existing practices.

Richez-Battesti and Vallade (2009, cited in BEPA (2010)) stress that a social innovation can be a product, production process, or technology (much like innovation in general), but it can also be a principle, an idea, a piece of legislation, a social movement, an intervention, or some combination of them.

The Stanford Social Innovation Review (Phills, Deiglmeier, & Miller, 2008) defines social innovation as 'a novel solution to a social problem that is more effective, efficient, sustainable, or just than existing solutions and for which the value created accrues primarily to society as a whole rather than private individuals. This corresponds to the argument of positive externalities derived from economic theory. Positive externalities are seen as the source of partial or total market failures and usually justify policy interventions. In this definition, positive externalities are seen as a prime motivation for social innovations.

Within the CRESSI project social innovation is positioned as a solution to some of the causes of and problems arising out of marginalisation, where marginalisation is a social process through which personal traits are transformed into potential factors of disadvantage. Within the context of high public debt and fiscal austerity, social innovation is increasingly seen as a means by which to overcome the scarcity of resources and the persistence of socio-economic challenges (Chiappero & Von Jacobi, 2015).

Despite the variety of definitions, for this paper I outline SI as

- solving needs is a first order goal (intentionality). Per definitionem needs must be satisfied for human beings in order to avoid serious physical or mental harm, where harm also comprises barriers to individual aspirations or social inclusion. In this sense, needs are objective, universal and transcultural (Hodgson, 2007: 7)
- handling problems, needs in a new way (innovative solution)
- relating people, processes, resources (technologies) in a new way (service architecture)

The field is practice-led. The aspiration to cover all aspects of the rich variety of social innovation projects we can find in practice explains the multitude of definitions that exist.

Intentionality seems important as many innovation projects have some social impact as a wider effect. But it is worthwhile thinking if innovation projects explicitly set up to solve social problems (e.g. of marginalization, of social determination etc) encounter barriers in a systematic way as patterns instead of viewing them as the product of singular achievements and pure luck.

This paper has a special focus on social innovation in healthcare. It is a conceptual paper which is aimed at preparing the ground for empirical field work. It is part of a research project (Social Innovation: Driving Force of Social Change (SI-DRIVE; <http://www.si-drive.eu/>)) that wants to enhance the theory on SI in developing a typology of social innovations and their relationships to transformative societal change and policy making.

The goal of this paper is therefore to provide conceptual guidance for a selection of social innovation projects in Austrian healthcare, so that the screening, identification and selection of social innovations in Austrian healthcare is as systematic as possi-

ble. The guiding question of this paper is: Are there patterns observable where social innovations in Austrian healthcare (most likely) occur?

In order to answer the above question I will follow a threefold approach, based on existing studies and analyses. This paper will first provide different views on Austrian health care (chapter 2): First, the view on health care markets, secondly, the view on the health care system, and thirdly, the view on health problems. In chapter 3 I will give a first overview of who engages in social innovation in Austrian healthcare and who uses the term “social innovation”. Chapter 4 screens social innovation projects submitted for a social innovation award according to the different views on Austrian healthcare provided before. Chapter 5 discusses the results and concludes.

2. Different Views on Austrian Health Care

2.1. The view on health care markets

Irrespective of whether funding is public or private, health care is always an economic process that generates output in the form of healthcare services on the basis of inputs. Health care systems may therefore be considered as health care markets.

I start out with results from an Austrian health satellite analysis which defines markets in healthcare (Czypionka, Schnabl, Sigl, Zucker, & Warmuth, 2014) and provides us with an overview of products and services in healthcare.

The core markets in healthcare are represented by the OECD system of health accounts, which provide a set of internationally comparable health accounts in the form of standard tables and define internationally harmonised boundaries of health care and basic categories thereof (OECD, 2000). Whereas the original manual of systems of health accounts demarcates health care along three axes: 1. health care by function, 2. health care service provider industries; and 3. sources of funding health care (OECD, 2000), the revised manual (OECD, 2011) also provides a classification of health care products.

A health care product can consist of both goods and services and has the primary purpose of improving, maintaining or preventing the deterioration of the health status of persons or mitigating the consequences of ill-health (OECD, 2011, p465).

Table 1: Overview of health care products

01 Hospital services	Short- or long-term hospital services for patients admitted for a minimum of 24 hours, i.e. medical, diagnostic and treatment services. The services are directed to inpatients and are carried out under the direct supervision of medical doctors, specialist medical professionals as well as traditional and complementary medical professionals.
02 Day care services	Short-term “hospital” services for admitted patients for less than 24 hours (day care), i.e. medical, diagnostic and treatment services. The delivery of day care services is not limited to hospitals, but can also be delivered in ambulatory premises or self-standing centres. This also includes pharmaceutical services, nursing services and laboratory and technical services delivered to day care patients as part of the bundle of services. The services are directed to day care patients and are car-

	ried out under the direct supervision of medical doctors, specialist medical professionals as well as traditional and complementary medical professionals
03 Medical and dental practice services	General and specialised medical services consisting in the diagnosis and treatment by medical doctors (Generalist medical professionals, Specialist medical professionals as well as Traditional and complementary medical professionals) of physical and/or mental diseases or health needs.
04 Other medical services	Services provided by authorised persons, other than medical doctors in the fields of Midwives' services, Nursing services, Physiotherapeutic services, Ambulance services and Medical laboratory services delivered as part of the composite package. This subcategory excludes all the services delivered to inpatients and day cases as part of the package of services, i.e. the service bundle consumed.
05 Residential care services	Services provided in nursing homes, homes for the elderly and disabled, services provided for mental retardation, mental health and substance abuse and other residential care services, with respect to the medical, nursing, ancillary and ADL (activities of daily living) components.
06 Nursing care services without accommodation	All nursing, ancillary and ADL (activities of daily living) services provided by authorised and unauthorised persons delivered to children and adults with a large dependency for activities of daily living and instrumental activities of daily living (IADL). Included are services provided by volunteers (for their remunerated services).
07 Retail trade services in medical products	This item comprises medical goods dispensed to outpatients and the services connected with dispensing, such as retail trade, fitting, maintaining and renting of medical goods and appliances. Included are the services of public pharmacies, opticians, sanitary shops and other specialised or non-specialised retail traders, including mail ordering and teleshopping. This group covers medicaments, prostheses, medical appliances and equipment and other health-related products provided to individuals, either with or without a prescription, usually from dispensing chemists, pharmacists or medical equipment suppliers, and intended for consumption or use by a single individual or household outside a health facility or institution. Included is the information and education service provided as part of the (simple) product delivery.
08 Preventive services	Prevention is any service that reduces the burden of mortality or morbidity from disease. This takes place at primary, secondary and tertiary prevention levels. Primary prevention anticipates the emergence and lessens the severity of diseases. Most population-based health promotion activities are primary preventive measures, e.g. vaccination. Secondary prevention activities are aimed at early disease detection, thereby increasing opportunities for less costly and invasive interventions to prevent progression of the disease and emergence of symptoms, e.g. screening for TB, diabetes, breast cancer, etc. Tertiary prevention reduces the negative impact of an already-established disease by restoring function and reducing disease-related complications. In SHA, prevention is limited to primary and secondary prevention.
09 Governance, management and health system administration	The focus of these services is on the health system rather than directly on health care. They are considered to be collective, as they may not be allocated to specific individuals but benefit all users. They direct and support the functioning of the health system. These services are expected to maintain and increase the effectiveness and efficiency of the health system and may enhance its equity. This includes <i>Administrative services regarding mandatory schemes</i> .
10 Health insurance, ex-	The administration of private health insurance essentially involves the

cept mandatory schemes	health insurance service and the service charge ⁹ for this. This covers expenditure on sales, the enrolment and policy service, claim adjudication, actuarial functions, legal support services, investment functions, corporate overheads and risk charges.
11 Health and social care goods and services produced by households for own use	This item contains all services generated within the household for own final use, which are reimbursed or the subject of transfers. It usually refers to care provided on a long-term basis through relatives and friends.

Source: OECD (2011)

A wider perspective to identify health markets is to ask whether purchasing decisions are to some extent subjectively based on health considerations. Here, health care products need not be supplied by health care service providers in the narrow sense, and therefore these health care products do not appear in the statistics of health care expenditures according to the systems of health accounts. For Austria Czypionka et al (2014) demarcated the wider health care markets on the basis of input-output-tables and additional material to estimate the subjective health motivation of purchasing decisions¹.

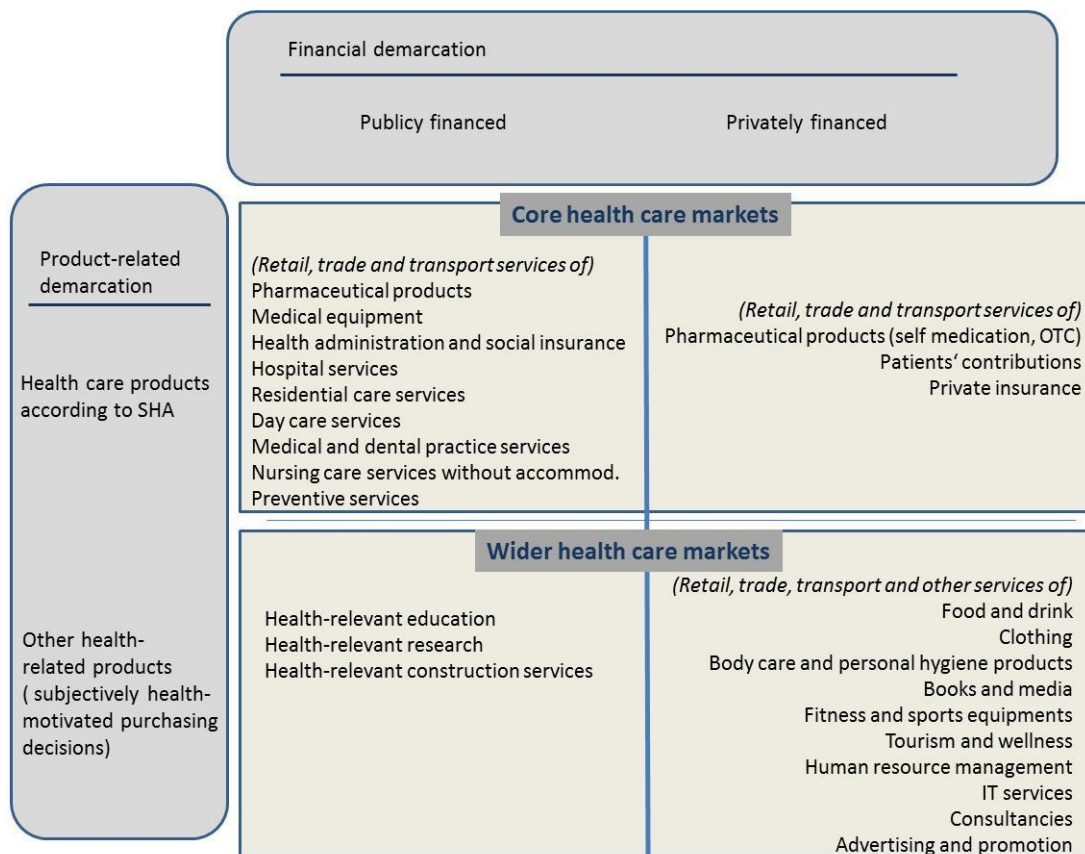
Consequently, the following goods and service markets have shares that are related to health (Czypionka et al, 2014, 70ff):

- Retail trade services of food and drink (contains also organic food and drink)
- Retail trade services of clothing (contains also protection items like helmets, protection gloves etc), sports clothing)
- Retail trade services of body care and personal hygiene products
- Retail trade services of books and media
- Retail trade services of pharmaceuticals (in the wider health care market only non-registered OTC products, otherwise products are part of the core health markets).
- Retail trade services of fitness and sports equipment
- Sports and recreation services
- Tourism services
- Wellness services
- Employment and recruitment services, job services (in health professions, for patients etc.)
- Retail and trade
- Transport (of individuals to and from health relevant activities, but also transport of health-relevant goods)
- Associations, self-help groups, syndicates
- IT services (health IT solutions)

¹ E.g. Expenditures on organic food are motivated by health reason to 41 per cent and have a market share of 5 per cent, hence approximately 2 per cent of the organic food market is part of the wider health care market.

- Consulting services (e.g. legal and tax advice for health care service providers)
- Advertising and promotion (for health-relevant goods and services)
- Health-relevant education and research (Schools , academies educating health professionals, universities etc, and research in biotechnology, psychology, biology and pharmacy).
- (Health-relevant) construction services

Figure 1: Health care markets



Source: Based on Czipionka, Schnabl, Sigl, Zucker, and Warmuth (2014)

Challenges

The view on wider health care markets enables a more comprehensive view on health care, indeed examples show that social innovation projects can be met in many of the above areas areas. However, it does not provide us with a view where to systematically find social innovations. Still, it is an attempt to open up, and at the same time demarcate the health care area.

A wider view on health markets makes more obvious that also social innovation in health may take place outside the core sectors. An example is the following, see Box 1.

Box 1: Residence as a source of energy - an example for a social innovation project in health

Residence as a source of energy (Kraftquelle Wohnen)

Project idea Living spaces exert a significant influence on health, perception, feeling, thinking, personal development and growth. In addition to protection from the weather as well psychological and physiological needs must be satisfied in order for a habitat to be suitable for human beings.

Our offer is aimed at people with mental or physical disorders / disabilities, who suffer from their existing living conditions. People eligible for our project are those who are unable to modify their residential premises in a suitable way without professional assistance.

Project goals The project aims at a sustainable and healthy change in the living conditions of the clients. Our effort is aimed at establishing the project as integral part of the health and social system, because our project can satisfy a missing link between health and social care settings.

Organisation Organised as a non-profit association, the project team consists of the chairwoman of the association, a project manager, employed workers, volunteers, also volunteer craftsmen and an evaluation team. Furthermore, the NPO entertains multidisciplinary collaborations with the university clinic Innsbruck, department of clinical psychology, different Christian charities, the provincial residential building cooperative. The NPO is financed by own contributions, donations, sponsorships, some public funding etc.

Source: http://www.sozialmarie.org/projekte/kraftquelle_wohnen.3676.html

2.2. The view on the health care system

Health care systems, in order to satisfy human health needs, have to fulfil certain functions, which have been classified by the OECD (2000, 2011). Here, the first-level categories of the functional classification aim to distribute health consumption according to the type of need of the consumer.

The classification of health care functions at the first-digit level is the following (OECD, 2011, p75):

HC.1 Curative care

HC.2 Rehabilitative care

HC.3 Long-term care (health)

HC.4 Ancillary services²

HC.5 Medical goods (non-specified by function) ³

HC.6 Preventive care

HC.7 Governance and health system and financing administration

HC.9 Other health care services not elsewhere classified (n.e.c.)

² non-specified by function, e.g. laboratory diagnosis, imaging etc, which are not attributable to other functions like cure, care, prevention etc.

³ Medicines and other medical goods are frequently a component of a package of services with a preventive, curative, rehabilitative or long-term care purpose. In inpatient, outpatient and day care consumption, they are not usually identified separately, except possibly at a more detailed level. [...] This category aims to include all consumption of medical goods where the function and mode of provision is not specified (OECD, 2011, p97).

The Austrian Health System Review (Hofmarcher & Quentin, 2013) thoroughly analyses health care in Austria on the system level and identifies strengths and weaknesses in provision and integration of supply and services with the necessary functions of health care systems.

In Austria, the provision of health care, financing and governance of the health care system is a mainly public function. Austrian health policy fosters equal access to high-quality care for all, irrespective of income, age and gender. Social health care insurance funds fulfill a crucial role here, as they guarantee access to a wide array of health and social care services. However, the level of user-charges and direct payments is also relatively high compared to other countries (Hofmarcher & Quentin, 2013: p. xxix).

In 2012 total health expenditure on health in Austria has been 11.5 per cent of GDP. Around 24 per cent of total health expenditures in 2012 were financed by private sources (62,2 per cent of private financing is out-of-pocket), 76 per cent of total health expenditures in 2012 were financed by public sources. Among the public sources, the social health care insurance funds are the most important source of financing (WHO, Statistik Austria www.statistik.at).

The social health care insurance is a mandatory insurance and covers almost a hundred per cent of inhabitants in Austria. There is no competition between the various social health insurance funds, as it is based on membership of an occupational group or place of residence. Health care is delivered **in case of need** to those insured within the social health insurance system according to a service catalogue. The services according to the service catalogue are provided by physicians in the inpatient and outpatient sectors. Which benefits to be included in the service catalogue is annually negotiated between the physicians' chambers at the Länder level and the Federation of Austrian Insurance Institutions (Hofmarcher & Rack, 2006: p. xxi).

Through the social health care insurance all members of the population (99,9 per cent) have relatively unrestricted access to all levels of care (general practitioners, specialists, hospitals). This entails that it is often up to the patient which care option he/she chooses and patients may encounter difficulties finding their way through the highly fragmented supply chain of health care services in Austria.

Longterm care is Social insurance health care funds only accounted for 0,7 per cent of longterm care expenditures in 2010 (Hofmarcher & Quentin, 2013: p. xxiii).

Challenges

Costs of the health care system are high in Austria, in absolute terms as well as in percentage of GDP they are above EU15 average (In 2012, Austria is ranked third concerning Total health expenditure (THE) % Gross Domestic Product (GDP) in EU 27 behind the Netherlands and France, see NHA indicators by WHO (2014b)).

In general, in Austria life expectancy is continually rising. But healthy life expectancy is 2 years below EU average (59,7 in Austria compared to 61,6 EU-27). Considering gender, the gap in healthy years of life between Austria and EU-27 average is more pronounced for men than for women (see data sheets for OECD, 2012).

With health care cost rising continuously, it is an inherently difficult process to decide which benefits have to be included in the service catalogue financed by social health insurance.

Spending on preventive medicine is relatively low: Health insurance funds do invest in prevention, but only after they have met their statutory requirements for curative medicine (Hofmarcher & Quentin, 2013: p.268f).

Although social health insurance coverage is comprehensive, access to healthcare services still varies and is determined by factors other than coverage. There are clear social inequalities in the consumption of certain medical services, e.g. dentistry, preventive services. Different social factors impact on health literacy which in turn impact on the consumption of different medical services (see also discussion on social determinants of health, e.g. WHO, 2010).

Psychiatric and psychosocial care is characterized by high variety of provision across Länder. In an outpatient setting, access to specialist services, particularly for children and young people, is insufficient. For consultation of registered psychotherapists (i.e. non-physicians) the proportion of costs that have to be carried by the patients out of pocket, is high (Hofmarcher & Quentin, 2013: 207f).

In Austria in general, and as well for certain services, the level of out-of-pocket payments for medical services is also rather high compared to Denmark, Sweden or the Netherlands (Hofmarcher & Quentin, 2013: 243), with 1,7 per cent of GDP very close to European average of 1,8 see (WHO, 2014b). Models of cost sharing result in considerable out-of-pocket contributions from patients, e.g. in dentistry.

Furthermore, international studies confirm that higher income groups receive preferential treatment in the Austrian health care system. Furthermore, social inequality arises as there are indications that private payments to physicians are used to shorten waiting times for publicly financed treatments. Furthermore private insurance openly claim to offer shortened waiting times for treatments, which was criticized as being in breach of the law (Hofmarcher & Quentin, 2013: 249f).

In terms of the health care system itself: Concerning the workforce, Austria is well equipped with physicians in terms of numbers (48,3 physicians per 10000 population in Austria compared to 33,1 regional average). However, in Austrian media there are recurrent discussions about the regional distribution of physicians, as peripheral regions in Austria have difficulties in attracting physicians, specialists in particular (Gebhard, 2014). The WHO Austrian health profile reveals that there are not as many nurses and midwives active in Austria as the regional average (79,1 compared to 80,5) (WHO, 2014a).

2.3. The view on health problems

A third approach provides a view on health problems in Austria: The prevalence of certain disorders may be the basis for social innovation projects, or the low spread of others. This will be based on WHO and OECD data and country comparisons.

Challenges

One of the main problem areas in Austria are noncommunicable diseases. Years of life lost due to noncommunicable diseases is particularly high, with 88 per cent of years of life lost due to NCD Austria is 8 per cent above regional average (WHO, 2014c). Cardiovascular diseases is the most frequent cause of deaths (43 per cent of total deaths), followed by cancer (27 per cent). Diabetes and chronic respiratory dis-

eases account for 4 per cent of total deaths each, 14 percent other NCD. In terms of prevention, Austria is below regional average in DTP3 immunization among 1-year-olds as well as measles immunization among 1-year-olds. Tobacco use among the population over 15 is far above regional average, for males as well as for females (WHO, 2014a).

Although alcoholism does not seem striking in WHO statistics, it is felt to be a problem in Austria and is reported about in media regularly as Austria's most common form of addiction. Around 10 per cent of the Austrian population become alcohol addicts during their lives, around 5 per cent are chronic alcohol addicts (Bundesministerium für Gesundheit, 2009: 140f).

According to the Austrian Health Survey 2006/2007 by Statistics Austria 471000 people (174000 men and 297000 women) have physical problems with basic activities in their lives such as eating, washing, getting dressed (Hofmarcher & Quentin, 2013: p 199). In Austria, a need-based longterm care allowance exists and is improved constantly (e.g. Federal Longterm Care Reform Act 2012). Still, there are shortcomings in terms of 24-hour care at home for severely mentally impaired patients, particularly for those with dementia and severely disabled children and young people according to Austrian Media. Furthermore, the structure of longterm care provision is under constant discussion, with first) an estimated 59 per cent of beneficiaries (Hofmarcher & Quentin, 2013: p. 202) [of the longterm care allowance, Anm.] mainly being cared for by family members (80 per cent women) and secondly, an informal market for care at home having grown alongside the informal care provided by families. This informal market for care at home seems to rely on migrant carers from Slovakia to a high extent.

3. Screening Social Innovation in Austrian Health Care

3.1. Who uses the term

While "social innovation" as a term is not used in official Austrian health policy, a multiplicity of aspirations to improve the coordination and governance of the public healthcare system are taking place that would conceptually qualify as social innovations. There are constant negotiations and activities to expand services covered by social insurance, to widen and adapt the structure of services offered to health needs of the population, while staying affordable. Still, as the Austrian health care system is very fragmented in administration and financing, every step of change seems an enormous effort. The wording used includes, but is not restricted to, terms like "reforms", "initiatives", "improvements", "structural measures" etc.

Innovative approaches to improve health care in Austria, which include social innovations without using the term are e.g. improved coordination between ambulatory and inpatient care, expansion of services to encourage 24-hour care at home, legislation and services which encourage group practices, often with multidisciplinary teams, e-medication as a pilot has started, programmes for integrated care have been developed and implemented, like the diabetes disease management programme Therapy actively Diabetes (for an overview of reforms see Hofmarcher & Quentin, 2013).

The strategic framework for health care provision in Austria is increasingly based on discussions and conceptual approaches promoted by the WHO, like the Health in All Policies approach, discussions on social determinants of health, health literacy etc. There is a current discourse in Austria, orchestrated by the Ministry of Health, for the strategic framework concerning the coordination of health promotion and prevention to encompass health targets. Ten health targets have been formulated, many of which will impact on social innovation in Austria (for health targets see <http://www.gesundheitsziele-oesterreich.at/health-targets-for-austria/>).

The term social innovation in Austria is mainly institutionalised through a private foundation, the Unruhe Privatstiftung. This private foundation annually issues a prize for social innovations, the SozialMarie, an academy award for social innovation projects (see Box 2) This private foundation explicitly uses the term social innovation, whereas official Austrian policy also engages in social innovation, but does not use the term.

Box 2: Institutionalising social innovation in Austria – an academy award for social achievements

The Unruhe Private Foundation about social innovation (2013)

"Social innovation drafts solutions to pressing social challenges. It provides room for new approaches, gives innovative answers and lays new paths. Social innovation either reacts to a new social question or it solves a known problem by a new practice. Action can be taken by the affected social group itself, it must in any case be appropriated and co-implemented by those concerned. In this manner, social innovation creates sustainable, exemplary solutions that inspire others."

SozialMarie – a prize for social innovation

The SozialMarie is the oldest prize for social innovation in Europe and honours outstanding projects in the field of social innovation every year since 2005. Beyond a financial recognition adding up to 54,000 Euros, the SozialMarie primarily offers a public platform for projects that provide innovative answers to societal challenges by means of new approaches.

A courage injection for creative social projects

Beyond the novelty of solutions for social problems, the selection criteria primarily include the extent to which respective target groups are reached and the effectiveness of implementation. The SozialMarie is a premium seal of quality for good and effective social innovation. By means of this prize, the goal is to encourage networking amongs projects and bring the discussion regarding social innovation forward.

SozialMarie Audience Award

The SozialMarie Audience Award is given out every year to three projects submitted from all over Austria, Hungary and the Czech Republic - countries that belong as total to the submission area by SozialMarie calls. Only audience decides about the prizes and can vote three times, once per country.

Source: Website of the Unruhe private foundation http://www.sozialmarie.org/the_prize_sozialmarie , last accessed January 13th, 2015.

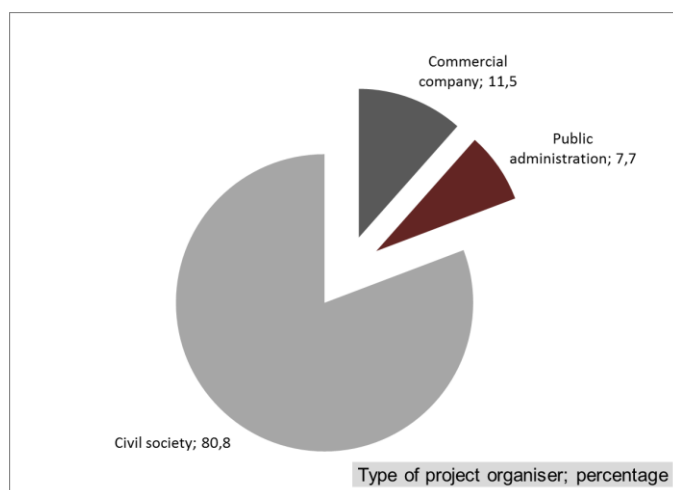
4. Health care and social innovation in Austria

Data

The following analysis is based on project submissions to the social innovation prize SozialMarie from 2012 to 2015. In that period 79 projects were submitted from project organisers located in Austria that were labelled health/ care⁴. One project had to be omitted, which results in 78 projects for further analysis.

There is likely to be a selection bias in the self selection mechanisms of the project submissions. In principle, the call for projects is open to all project organisers from commercial companies, by the social economy (civil society initiatives, NGO, NPO, associations) or by public administration that address current social problems. Eligible projects must have been implemented for a sufficient period at the time of filing, while still running. However, the distribution of project applicants by type of organisation is skewed. Out of 78 submitted projects, nine (11,5 per cent) were submitted by commercial companies, six by public administration units (7,7 per cent) and 63 (80,8 per cent) by organisations from civil society.

Figure 2: Type of project organisers in project submissions of social innovation award



Source: Projects submissions on <http://www.sozialmarie.org/> , own calculations.

Results and discussion

Relating to the demarcation of health care markets and products, where products refer to goods and services, it seems that the majority of health care projects submitted for the social innovation award refer to the wider health care markets (see Table 2). Bearing in mind the distribution of project organisers above, it may be a working hypothesis that social innovation projects organised mainly by civil society have a high inclination towards the wider health care markets. This could change if we con-

⁴ <http://www.sozialmarie.org/>

sider that especially in the public realm social innovation takes place, but projects may not be subsumed under the very term. Most likely these social innovations in the public realm would contribute more to the core health markets.

In the core health care markets the majority of social innovation projects is carried out in specialised medical services by different sorts of health professionals. This refers to animal therapies, nature therapies, etc, to psycho-social care in various special situations like violence, dementia, eating disorders, or to specialised services in crises or for especially vulnerable groups, e.g. psycho-social care for families of a terminally ill child, psycho-social care for infant refugees, etc.

In the wider health care markets, consultancy and advice is dominant. There are mainly two forms of consultancy and advice, one in the form of coaching to motivate people suffering from ill health to cope with their illness, socialize, reconcile ill health with their jobs etc. Another form of consultancy and advice is guidance, i.e. nurses, peers, relatives guide patients and their relatives through the supply chain of Austrian health and social care, which has a multitude of offerings that may be difficult to survey when (newly) diagnosed. Social innovation projects in education and training also account for a high share between 2012 and 2015. These projects relate to training measures for health professionals on the one side, as these are subject to high pressures and often have to keep up with new developments and constantly have to adapt their competences (mobile childcare in all conditions and phases of these conditions, AIDS, dementia etc), but also educational projects relating to health literacy (e.g. food) or social competence and mutual understanding between generations.

Table 2: Health social innovation projects 2012-2015, by health care product

	Health care products/ sectors	Number of health social innovation projects 2012-15
<i>Core health care market</i> 35 %	<i>03/04 Specialised medical services</i>	19
	<i>03/04 General medical services</i>	1
	<i>05/ Residential care</i>	6
	<i>06 Nursing mobile care</i>	2
<i>Wider health care market</i> 65 %	Consultancy, advice (coaching)	12
	Education/training (e.g. food)	16
	Consultancy, advice (guidance)	6
	Tourism, recreation services, sports	6
	Selfhelp initiatives/groups of relatives	4
	Employment services	3
	Accommodation	3
	Transport services	1
	IT services	1
Total		78

Source: Projects submissions on <http://www.sozialmarie.org/> , own calculations.

Considering health care systems and their functions (see , the analysis of social innovation project submitted for the social innovation award shows that 56 per cent may be subsumed in the classification of health care functions at the first-digit level by the OECD (2011). Curative care is when the symptoms correspond to an acute condition, a remission or cure (HC.1) is sought and expected. The one curative project in Table 3 relates to the project AmberMed (see Box 3). Many conditions cannot, however, be completely cured and lead to chronic conditions with some degree of functional decline, which makes rehabilitative care and also preventive care (and a mix thereof) necessary. Curative care is a major public health care function in Austria and plays a minor role in the below analysis, which is mainly based on social innovation projects by civil society. However, rehabilitative, longterm and preventive care rank high and are almost equally distributed.

Box 3: AmberMed - an example for a social innovation project in health

AmberMed

Project goals AmberMed provides outpatient medical care for people without social insurance, in particular asylum seekers, people with a migration background and Austrian citizens without social insurance. The assistance is offered in acute but also in chronic diseases.

Organisation Since 2006 this project of the Diakonie Refugee Service in cooperation with the Austrian Red Cross offers infrastructure and the medications. The Diakonie Refugee Service as main implementing body employs the core project team, is responsible for the coordination of the project, the support of the volunteers and the further development of the project. Doctors work on a voluntary basis and their medical advice is translated by voluntary interpreters. Everybody who is in need will receive medical support, no matter whether they are legal residents. A high proportion of patients does not know if they will be able to stay in the country at the time of consultation.

Diakonie Flüchtlingsdienst (Diakonie Refugee Service) is an NGO that engages in the counseling, support, housing, education and medical as well as psychotherapeutically treatment of asylum seekers, refugees, migrants and Austrian citizens. It is part of Diakonie Österreich which is the welfare body of the protestant churches. It is one of the five biggest Austrian welfare organizations.

Source: <http://derstandard.at/1269449290816/Man-kann-die-Kranken-nicht-einfach-wegschicken> and <http://www.sozialmarie.org/>

Further 44 per cent are social innovation projects that relate to health care, but cannot be directly subsumed under the OECD functions. One illustrative example is drug addiction, where public health care offers various services and support for drug withdrawal. These service offerings are more concentrated on actual therapies, when detoxification is accomplished they stop at some point and dismiss people into the world outside again. But there are sensitive phases of social reintegration apart from detoxification and psychological therapies where social innovations by civil society organisations may play a decisive role as they lead people to find new ways and above all new social relations and daily activities, away from their old networks and routines (which mainly related to drugs). Re-integration projects of various kinds account for 13 out of 78 in the present analysis. Projects labelled *Access to healthcare* often relate to projects that address social inequalities in the consumption of certain medical services (see section challenges in 2.2 The view on health care systems). Different social factors (e.g. migration background) impact on health literacy or on knowledge about newly entered healthcare system which in turn impact on the con-

sumption of different medical services. Social innovation projects e.g. offering peer support try to find a solution here.

Table 3: Health social innovation projects 2012-2015, by health care function

	Functions	Number of health social innovation projects 2012-15
<i>Health care function according to OECD (2011)</i> 56 %	HC.1 Curative care	1
	HC.2 Rehabilitative care	13
	HC.3 Longterm care	15
	HC.6 Preventive care	15
<i>Health care function beyond OECD (2011)</i> 44 %	Re-Integration	13
	Support in crises	9
	Health personnel measures	7
	Access to health care	5
Total		78

Source: Projects submissions on <http://www.sozialmarie.org/> , own calculations.

Considering health problems addressed in social innovation projects submitted for a social innovation award from 2012-2015, it is striking that not those conditions where Austria stands out in international statistics seem to motivate the social innovation projects in healthcare, at least those organised by civil society. Non-communicable diseases like diabetes, cancer and cardio-vascular diseases account for a minority of social innovation projects in the present data set. The majority of social innovation projects are motivated by psycho-social care, i.e. maladjustments of some sort that may have an obvious cause (violence, terminal illness, political persecution) that is addressed by the projects or may be only detectable through symptoms (eating disorders, ADHD/ADD etc). As described in 2.3 The view on the health problems, in psychiatric and psychosocial care access to specialist services, particularly for children and young people, is insufficient and for consultations of registered psychotherapists the proportion of costs that have to be carried by the patients out of pocket, is high (Hofmarcher & Quentin, 2013: 207f). This seems reflected a lot in social innovation projects relating to health. Ranked second in Table 4 are preventive measures addressing healthy people. This also corresponds to weaknesses in Austrian public healthcare, where preventive measures are only financed once statutory requirements for therapeutic measures are fulfilled. Furthermore, social innovation projects in dementia often relate to projects addressing old age in general, longterm conditions and psychological care for nurses and relatives burdened with longterm and home care.

Table 4: Health social innovation projects 2012-2015, by health problem

Health problem	Number of health social innovation projects 2012-15
Psycho-social problem	19
Healthy	11
Dementia	9

Terminal illness	8
Longterm conditions/Disabilities	7
Psychological care (for carers, longterm care)	7
Old age	5
General	5
Shortterm conditions (infections, OPs etc)	2
Cancer	1
Diabetes	1
Cardio	1
Addiction	1
HIV	1
Total	78

Source: Projects submissions on <http://www.sozialmarie.org/> , own calculations.

5. Conclusions

This paper has a special focus on social innovation in healthcare. It is a conceptual paper which is aimed at preparing the ground for empirical field work. The goal of this paper is therefore to provide conceptual guidance for a selection of social innovation projects in Austrian healthcare for in-depth case studies, so that the screening, identification and selection of social innovations in Austrian healthcare is as systematic as possible. The guiding question of this paper is: Are there patterns observable where social innovations in Austrian healthcare (most likely) occur?

In order to answer the above a threefold approach is applied: Existing and available social innovation projects are analysed first, with a view on health care markets, secondly, with a view on the health care system, and thirdly, with a view on health problems. Social innovation projects submitted for a social innovation award were screened according to the different views on Austrian healthcare provided before.

The analysis leads to the following preliminary findings:

In 81 per cent of the project submissions, labelled health/care, for the social innovation award the project organizer comes from civil society, which is also conditioned by the goals stated by the private foundation that has implemented the award: It wants to award achievements in social work, make innovative solutions in social visible and presented in a positive way (Sutterlüty, 2008). But social innovation in public sphere and companies may be underrepresented, as actors there use other terms like corporate social responsibility, reforms, structural measures etc.

Relating to the demarcation of health care markets and products, where products refer to goods and services, it seems that the majority of health care projects submitted for the social innovation award refer to the wider health care markets (65 per cent), not the core markets (35 per cent). This may correlate with the high proportion of project organizers from civil society.

Concerning functions, it seems that there are various contexts/challenges that make social innovation necessary in addition to existing policy and health and social ser-

vices. Social innovation projects screened were often found to fulfill the following functions:

- Social innovation projects as remedies to existing services: Public social and health care services exist, but are not used by the target group. Statistics in this case often hide the problem and may lead policy responsables to wrong conclusions that the service is not needed, but civil society organisations working in the field perceive that the needs of the target groups are not addressed properly (e.g. for homeless).
- Social innovation projects as phasing out of public health care services, where health care services exist but would need social care service to complement them, e.g. for sensitive phases of re-integration (e.g. in drug withdrawal).
- Social innovation projects solving problems appearing on the edge of society, where the problem realization is too recent and problems need different/additional approaches than those established. Social health care could not yet respond, here civil society organisations like charities are often more flexible (e.g. children carers).
- Social innovation projects smoothing access to healthcare, as this is also socially determined. Social insurance in Austria is comprehensive, but marginal social groups may fall out of the system (e.g. asylum seekers) or persons with migration background are not familiar with health care system of new country and do not realize options.
- Social innovation projects to boost preventive health care services, as preventive services offer vast possibilities but cannot all be covered by social health care insurance in the present form. Social healthcare insurance funds do invest in prevention (mainly vaccinations), but only after they have met their statutory requirements for curative medicine (Hofmarcher & Quentin, 2013: p.268f). Diseasemanagement programmes were a huge step and took decades of negotiations to get operationalised within public health care.

Considering health problems addressed in social innovation projects submitted for a social innovation award it is striking that not those conditions where Austria stands out in international statistics seem to motivate the social innovation projects in healthcare, at least those organised mainly by civil society. Non-communicable diseases like diabetes, cancer and cardio-vascular diseases account for a minority of social innovation projects in the present data set. Still, social innovation projects seem to reflect weaknesses of the Austrian health system: The majority of social innovation projects address psycho-social care, especially for children and young people, dementia, and the situation of carers for patients with dementia and other long-term illnesses.

For a selection of projects to depict social innovation in Austrian healthcare I conclude that at least social innovation in public organisations should be represented more. This will most likely impact on the distribution of core and wider health as it may be assumed that public organisations also considerably innovate socially in the core healthcare sectors.

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Non-Invasive Prenatal Test: An “invasive” innovation in prenatal testing

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Non-Invasive Prenatal Testing (NIPT) is a relatively new offering in prenatal testing. Hospital District of Helsinki and Uusimaa (Finland) started to provide NIPT alternative in January of 2015. The purpose of this study is to investigate the disruptive elements of NIPT in prenatal testing services. This exploratory study shows that the use of NIPT creates certain challenges for both the consumers and the service providers. We argue that genetic counselling is essential and should be tightly integrated to the patient-provider relationship and to the supported peer to peer networks as a way to organize service production and delivery. Our research develops new insights into the use of NIPT and also enriches the research of service innovation with the focus on the implementation of innovation in knowledge intensive services.

1. Introduction

1.1. NIPT background

Prenatal screening and testing for chromosome abnormalities is an essential part of antenatal care for the best reassurance for the pregnancy and to protect the unborn. The screening, testing, diagnosis and intervention are integrated and add value in the service chain (Oepkes et al., 2014). For decades, in case of a screening-based risky case, only invasive diagnostic tests (e.g. *chorionic villus sampling* and *amniocentesis*), entailing a miscarriage risk, were offered (Allahbadia et al., 2015). New generation technologies, e.g. genetic and genomic technologies, facilitate innovative services to provide safer and easier screening with higher precision. Since its introduction to clinical practice in Hong Kong in 2011, Non-Invasive Prenatal Testing (NIPT) based on next-generation sequencing of cell-free DNA in maternal plasma has quickly spread on the landscape with its high sensitivity, specificity and little risk of pregnancy loss to assess the most common fetal aneuploidies-Trisomy 21 (Down syndrome), Trisomy 18 (Edwards syndrome) and Trisomy 13 (Edwards syndrome) (Allahbadia et al., 2015) (Kellogg, Slattery, Hudgins, & Ormond, 2014). NIPT is a prominent application of personalized medicine (PM), a field using diagnostic tools to identify specific biological markers to provide the right treatment in the right dose to the right patient at the right time.

However, despite of the admirable advantage, NIPT still has not been considered as the replacement of the currently conventional screening approaches that can assess a

wider range of chromosome abnormalities beyond those assessed by NIPT (Hui & Hyett, 2013) (Long & Goldblatt, 2014) or the diagnostic testing methods that are more accurate and effective in detecting genetic disorders with more affirmative results (Ryu & Kim, 2015). Because NIPT's false positive rates, follow-up invasive diagnostic testing is necessary to confirm the presence or absence of the abnormality (Oepkes et al., 2014). In this way, NIPT is usually provided as an option with non-absolute advantages in the prenatal screening and testing paradigm. NIPT is not a diagnostic test but an advanced screening test (Ryu & Kim, 2015).

1.2. Research context and objectives

In the recent five years, technical disadvantages and clinical limitations of NIPT have been deeply and widely investigated. But the study of the social effects of NIPT application is still far from being sufficient. Our major point of interest in the present study is the possible interruptions caused by NIPT application in the established business models and service operations and practices in maternal and natal healthcare. We suspect that the application of this non-invasive technology would produce invasions to the current service network and transform the value chains in prenatal testing.

Hospital District of Helsinki and Uusimaa (HUS) started to formally provide this innovative testing approach in January of 2015 as an alternative screening method for the detection of fetal chromosome aneuploidies to the women with increased risk factors. Several private clinics in Finland also offer NIPT. We focus on this case, make efforts to explore the application of NIPT from both the provider's view and the consumer's view and detect the possible interruptions and disruptive elements caused by the entrance of NIPT in current prenatal testing service in the district of Helsinki and Uusimaa. More specifically, we are studying the degree of disruption in prenatal testing services market by modelling and comparing the processes before and after the adoption of NIPT. This is based on the postulation that disruptiveness is one possible attribute of innovation. Innovation attributes affect its rate of adoption, i.e. the relative speed with which an innovation is adopted by members of a social system (Rogers, 2010). As disruption is not necessary binary, the degree of disruption can be studied as a variable in connection with the degree of precision or invasiveness. In addition, we would like to propose possible solutions for converting the interruptive innovation to a constructive innovation.

Our research develops new insights into the application of NIPT with a more practical and phenomenological view and also enriches the research of service innovation with the focus on the implementation and interruptions of innovation in knowledge intensive services. There are several reasons why this type of study is warranted. Health services management is facing many challenges related to rising demands, changing environments and stricter budgets that necessitate the exploration of innovative solutions. This means acquiring deeper understanding of the innovation diffusion process and the disruption opportunities in health care services. Personalized medicine and the use of genome data in clinical practice can fundamentally change the integration, coordination and control of health services. Genomic innovations and

technology create both new opportunities and challenges for all the stakeholders from patients to the producers.

2. Diffusion of innovations in health services

2.1. Innovation attributes – disruptive or complementary?

NIPT raises questions of how innovations, and genomic innovations in particular, diffuse in the provision of healthcare services. According to Rogers, innovation attributes, such as relative advantage, preventiveness, and compatibility, affect innovation's rate of adoption. The innovation diffusion process can take many forms: there are for example centralized (top down), and decentralized (client-controlled) diffusion systems. Innovation sub-processes in organizations can be divided into (1) initiation and (2) implementation phases (Rogers, 2010). Disruption in turn is an innovation making things simpler and more affordable. The three enablers of most disruptions are: 1) a simplifying technology, 2) a business model innovation, and 3) a disruptive value network. Examples of health care business models include Solution Shops, Value-Adding Process Businesses, and Facilitated networks (Christenson, Grossman, & Hwang, 2009).

In this study the degree of disruption is seen as a variable and this line of thought is applied to the use of the NIPT in prenatal screening services to investigate the effects and implications of an emergent technology and related services. How does the genomic innovation diffuse? We ask if NIPT-based services represent more of a disruptive or complementary innovation. Which attribute is the one that dominates in the current maternal care services ecosystem? Can NIPT disrupt the prenatal testing market under certain conditions, and if so what is the impact on e.g. value propositions, channels, key partnerships and customer choices? How are the elements of invasiveness and precision connected to the analysis of the disruption opportunities? The answers are searched via process comparisons before and after the entrance of NIPT in maternal and natal healthcare services. In this paper we focus on a public health organization and try to identify and categorize the ways in which this genomic innovation affects the patient choice environment and managerial integration, coordination and control in a large university hospital.

2.2. NIPT application in Finnish healthcare

HUS is the first Finnish public health organization where NIPT has been introduced. At HUS, NIPT is presented as one of further tests, including *Chorionic Villus Sampling* (CVS) and *Amniocentesis*, for indications including an increased risk ($\geq 1:250$) of chromosomal abnormalities based on the first trimester screening and assessment, abnormal result in the second trimester serum screening, fetus' swelling neck (reaching 3-3.9 mm), a high maternal age (> 40 yrs) and a previous pregnancy with a trisomy. General check-up will be followed up if the result of NIPT is negative. Abnormal result in NIPT can be confirmed by further diagnostic test (CVS and Amniocentesis). It means

that the initial screen-positive subgroup does not necessarily undergo a diagnostic test directly based on their preference but is offered with a further selection, which aims to improve women's reproductive choices and reduce the number of patients who will be subjected to unnecessary or unwanted interventions (Long & Goldblatt, 2014). But meanwhile, people choosing NIPT may have to wait longer for confirmative answers. Figure 1 shows the main process of NIPT application at HUS.

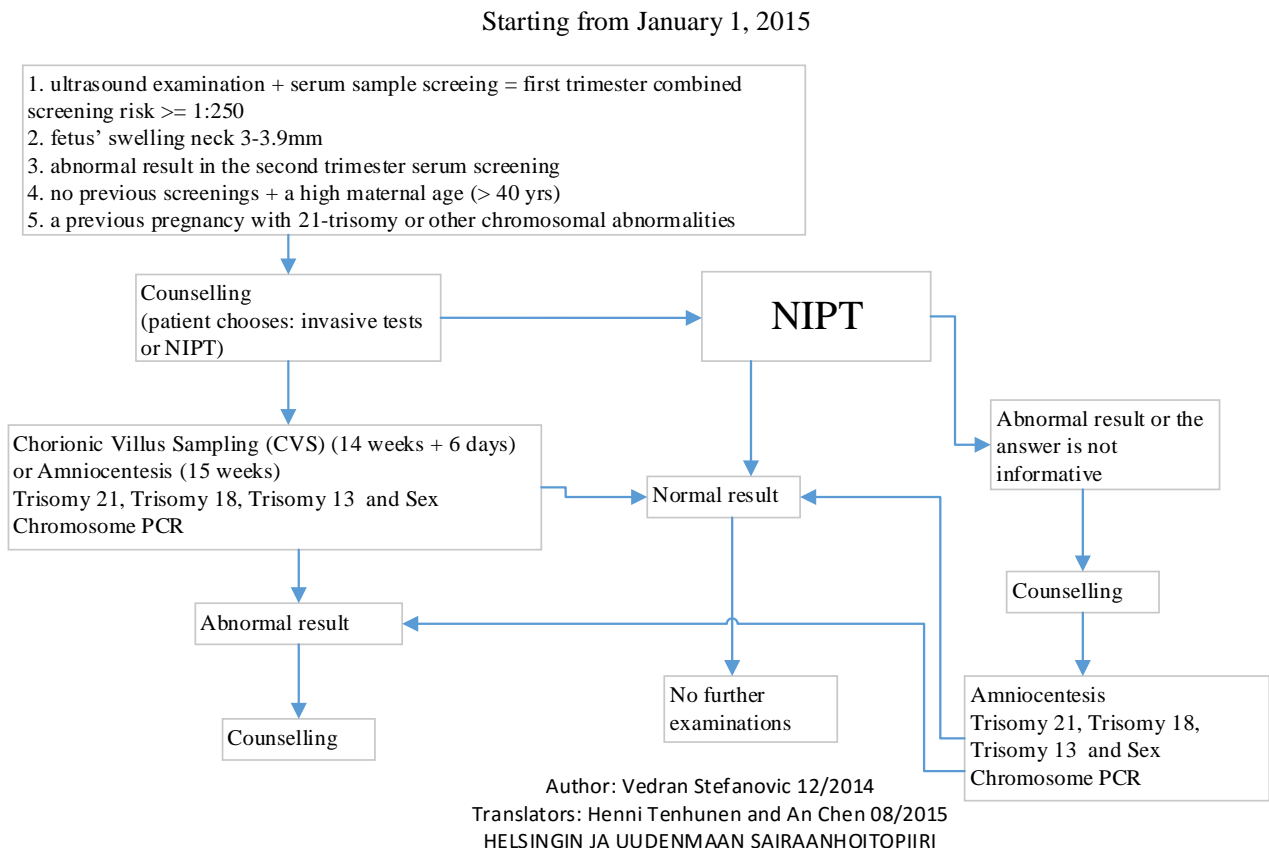


Figure 1. NIPT application in public health service (HUS).

The latest statistical data show that since the introduction of NIPT, nearly 77% of the patients that were given counselling chose NIPT and around 23% of them chose the conventional tests. There are several cases of rejecting the further tests after the screening. The introduction of NIPT has reduced the number of invasive diagnostic procedures (circa 700 procedures per year previously) and thus also the risks of miscarriage have decreased (van der Meer, 2015).

The adoption of NIPT has introduced a new level of logistics, as the use of NIPT involves taking blood tests and also midwife counselling before and after the test. Because analyzing the samples is not feasible in Finland at the moment, the samples are sent to the United States via Belgium. The blood samples are taken on Mondays

and Tuesdays and the samples for the test are sent by Express mail to GENDIA's lab in Antwerp, Belgium, and the samples arrive there within 2 days. Getting the results from the NIPT can take up to three weeks, ten days being the average waiting time. This can be too long for those approaching the latest possible termination week. HUS is currently the only public health organization offering NIPT but there are plans to adopt NIPT in other university hospitals as well. In conjunction with the NIPT a new Fetomaternal center was founded at HUS and the purpose is to gather together interdisciplinary competences related to fetomaternal care. Women who have higher risk factors can come to FMC for NIPT from all over Finland (van der Meer, 2015).

3. Methodology

3.1. Research approach

The use of genome data in clinical practice illustrates the transition from intuitive medicine to precision medicine. As far as we know, there is no structured innovation diffusion analysis regarding the disruptive elements and challenges related to the implementation of this new innovative service based on NIPT technology. The use of a new emergent technology creates a research frontier that is studied with an exploratory research approach. Exploratory research is conducted for a problem that has not been clearly defined and it can be used to gain significant insights into a given situation and familiarity with a phenomenon in order to formulate a more precise problem or develop hypothesis. Exploratory research is suitable for this study because it is flexible and can address research questions of all types. (Shields & Rangarajan, 2013)

3.2. Methods: Interviews and Netnography

We interviewed practitioners involved in the provision of NIPT services (e.g. midwives, technicians, specialists, and geneticists). We encouraged the practitioners to compare their daily work before and after the NIPT and inquired them about the disruptive potential of the services based on this genomic innovation. The conversations were organized around several issues: changes in the workflow, informed choice of mothers and families regarding genetic tests, counselling practices and estimations of further development.

We planned to conduct in-depth interviews with women and families (mainly from the high risk subgroup) living in the HUS region, who had undertaken or rejected NIPT or other prenatal testing services. Since our research application to ethical committee was still in the process of review, the original research plan was compromised and we had problems to access the patient base without the approval. Thus we utilized our personal relationship to contact with mothers who had experiences of prenatal screening and testing (with NIPT or without NIPT) and explored their experiences, expectations and opinions regarding NIPT and its application. Totally, we learned from 2 mothers who undertook NIPT, 2 mother who chose conventional tests before the introduction of NIPT and 4 mothers who got normal results at the early-stage screenings.

In order to enrich the data in the context, we applied netnography (Kozinets, 2002), which has been widely used in recent consumer and market research, as a data collection strategy. Online communication (e.g. internet-based forums, online chat rooms and blogs) has been significantly influencing the life of the contemporary consumers and marketers. It provides relatively objective information on expectations, experiences, decisions-making and consumption behaviors of consumers or consumer groups (Kozinets, 1998). Netnography is interpretive method devised to investigate online communities and communications in a faster, simpler, and less expensive way than traditional ethnographies, and it is more naturalistic and unobtrusive than focus groups or interviews (Kozinets, 1998) (Kozinets, 2002). In this study, we sought for online discussions in Finland regarding NIPT by searching google with the keywords "NIPT foorumi", "NIPT testi", "NIPT keskustelu", "NIPT blogi", and "Nipt tutkimus". Vauva and Kaksplus were the two main websites where people discussing maternal and natal services, with some threads specific to NIPT.

We analyzed practitioners' interviews, consumers' interviews and netnographic data. Practitioners' and consumers' views on the interruptions caused by NIPT in prenatal testing service were separately and thematically organized and presented.

4. Findings

4.1. NIPT application opportunities and challenges perceived by mothers and families

Our data reveals that the majority of women praise NIPT for its positive advancement in prenatal testing, emphasizing the zero risk of miscarriage and its easiness in practice. Some women in the normal group comment that the introduction of NIPT as an option for further tests after the initial screening can increase their autonomy in reproductive decision making.

However, as NIPT is offered after the early screening as an optional further test to women categorized into the high risk group, these women and families who are going through the traumatic experience face the choice challenges. First, safety, accuracy and certainty are the essential considerations of women and families in making decisions on prenatal care services. Since NIPT and conventional tests have their own strengths and weaknesses at these aspects and they cannot serve all goals, mothers and families have to make trade-offs. In Figure 2 the prenatal testing methods are mapped based on their invasiveness (safety) and precision (accuracy and certainty). This diagram illustrates the service ecosystem of prenatal screening and diagnostics from the consumer decision making perspective. It shows how innovation attributes of invasiveness and precision are emphasized in each of the testing services.

Second, making meaningful and informed choices and decisions requires thorough information. Women have difficulties to concentrate and rationally process the

information on prenatal screening and make choices in an anxious state of mind that they have never prepared to face. Some women even refuse to search for information online or offline, because they want to avoid the scary texts and shocking pictures, which increase their anxieties. In addition, women and families appreciate more experiential information, not just scientific or statistical information about the prenatal testing methods. But since the high-risk subgroup that needs the further tests is minor and the NIPT application in Finland is at early stages, it is impossible for women and families to find a vast amount of experiential information online or offline. Thus, to some extent, the unique and appealing aspects of NIPT do not always bring freedom to women and families, instead NIPT application could complicate women's decision-making processes in prenatal care and women may require more resources and support to make choices that align with their needs and preferences in such out-of-expectation situations (Farrell, Agatisa, Mercer, Smith, & Philipson, 2015).

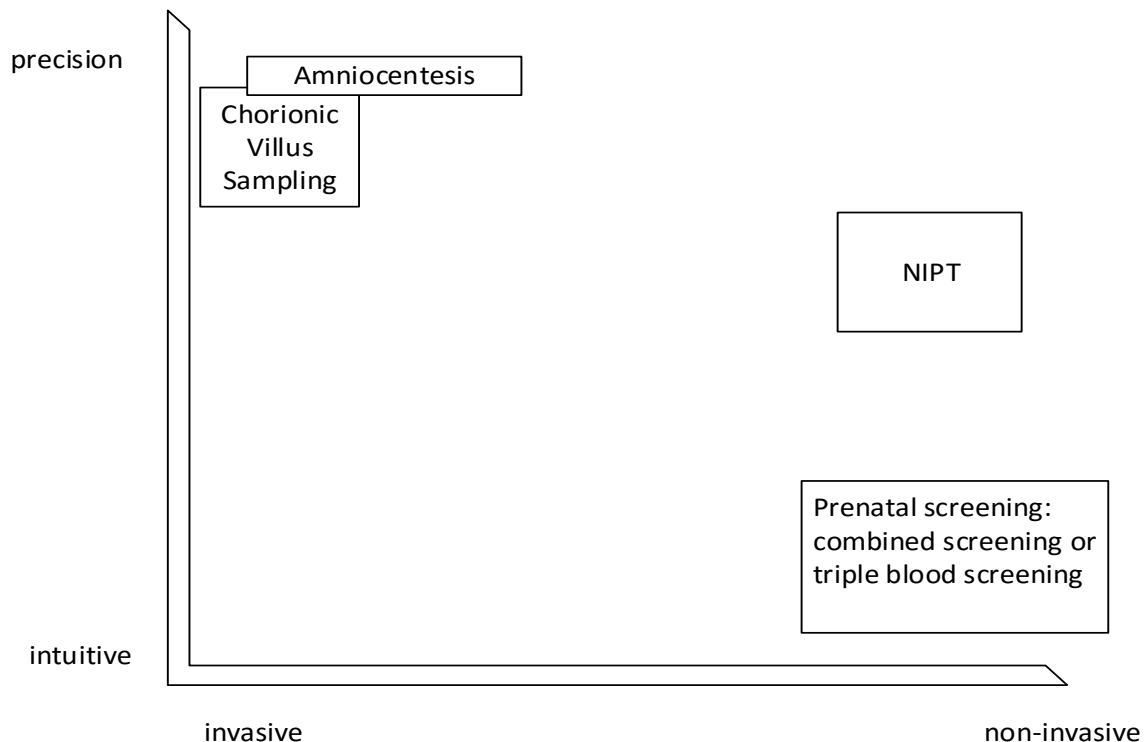


Figure 2. Invasiveness (safety) – Precision (accuracy and certainty) diagram of prenatal screening and testing methods.

4.2. NIPT application opportunities and challenges perceived by practitioners

From the viewpoint of the service providers the use of NIPT entails both opportunities and challenges. In the interviews the following advantages and opportunities of NIPT were mentioned: its cost-efficiency and safety, the fact that it empowers women via wider reproductive freedoms and that it reduces the need for invasive tests and thus the risks for miscarriage are smaller. Amid these positive reviews we wanted to dig deeper and ask the service providers about the challenges related to NIPT.

The practitioners brought up the issue of slightly more complicated logistics due to NIPT, most notably the long waiting times, as the blood samples are only taken on Mondays and Tuesdays and sent abroad for analysis. The results then also affect scheduling of counseling with the geneticist and midwives and of the possible invasive diagnostic tests. The midwife we interviewed pointed out that midwives currently take on most of the NIPT counseling and in this work they face certain difficulties based on the fact that patients represent a very heterogeneous group: some are highly educated, some need a lot more explaining starting from the basics, some do not understand the strongest common language properly, and then there is the challenge of always maintaining a neutral, unbiased tone in the counseling, not recommending any specific options, merely explaining their meaning and scope. Same has to be achieved also when there is a translator involved delivering the message.

In order to gain insight into the disruptive elements of the NIPT based services, we inquired the opinion of the geneticist and other professionals about whether and to which extent NIPT could disrupt the prenatal testing market and replace the other screening and diagnostic tests. The consensus at this point of time was that although NIPT has decreased the number of invasive procedures and will continue to do so in the future as the technology gets more accurate and wide-ranging, it cannot entirely replace the other prenatal testing methods. Therefore, it will likely remain a complementary innovation for the most part, as long as diagnostic certainty is required for the termination of the pregnancy. In Figure 3 NIPT is positioned in relation to its disruptiveness and precision based on the interviews.

The practitioners explained that the use of NIPT generates an interesting new challenge. The fewer invasive operations there are, the less experience the physicians get and thus the higher the risks in the remaining invasive procedures. The natural solution to this dilemma is to centralize the invasive testing services in the hands of the most experienced physicians who specialize in these procedures. This means that many physicians lose one previously relevant part of their work, which can be seen as a disruptive element of the NIPT-based service. Allahbadia et al. (2015) state that the use of NIPT in low-resource settings has the potential to reduce the need for skilled clinicians doing invasive testing.

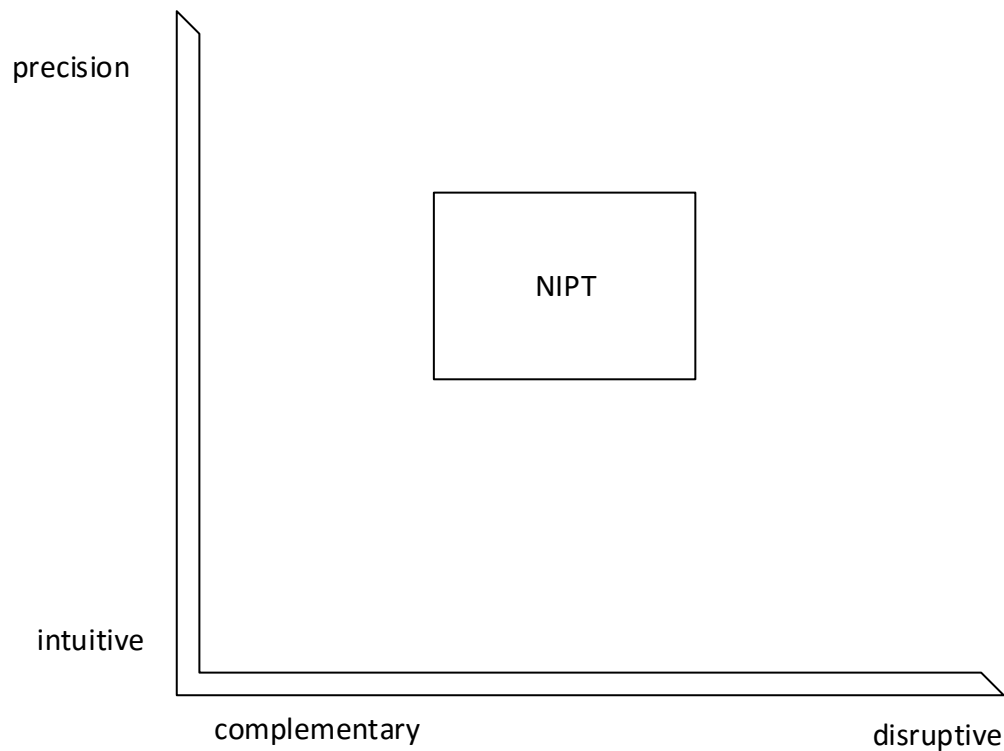


Figure 3. Disruption – Precision diagram of NIPT.

5. Discussion

5.1. Complications related to service operation and decision-making

Challenges in maternal and natal healthcare could be solved by new technology, but the introduction of a new technology may create new challenges. In our case, NIPT application increases the safety in prenatal further screening and testing and brings autonomy for women and family, but it also complicates the service operation and generates choice challenges. Simply applying the new technology to current business models or service chains does not guarantee at all that the true value of the technology will be obtained. This is because the innovation's attributes affect how the innovative service is adopted in healthcare organizations and to what extent it replaces and disrupts the existing market offerings and creates new value propositions, business networks and customer segments.

In the case of NIPT the diffusion process is in the early stages and has been a combination of centralized (top down) and decentralized (client-controlled) diffusion, because the expectations to adopt NIPT at HUS have partly been generated by the use of NIPT in the private clinics. As the service is now available both in the private and public sectors, the disruptive opportunities have increased remarkably, although the complementary elements still dominate as long as the diagnostic invasive tests are required for the termination of pregnancy, and the early screening detects a wider range

of abnormalities than NIPT, although with much lower accuracy. Thus we observe that not all the enablers of disruption have materialized fully: 1) the technology is not sufficiently simplifying, 2) the service is built on existing management traditions, and 3) the role of supporting value networks in the innovative service provision has not been understood and feels distant and unfeasible to the practitioners.

5.2. Solutions: increased counselling tied to supported peer-to-peer networks

To address the complications caused by NIPT, we propose management and decision-making support solutions that facilitate the beneficial use of this safety-increasing and procedure-simplifying technology for all the stakeholders. Regarding integration, midwives, geneticists and genome data specialists partly disrupt the traditional role of the surgeons and physicians due to the smaller need to use invasive operations to detect abnormalities in pregnancy. Genetic counselling is and will have to be even more tightly integrated to the patient-provider relationship in the prenatal testing environment. When it comes to coordination, supported peer-to-peer networks can be used to organize service production facing the mass customization dilemma. Finally, as for control, the non-invasive prenatal testing lowers the technical and other thresholds for acquiring genomic data about risk factors and this disrupts the way in which risk is avoided.

In the world of cutting-edge genomics and precision medicine, the introduction of NIPT has to be supported by the rapidly changing information and the availability of information on NIPT and other prenatal screening and testing methods in an objective and appropriate form (Long & Goldblatt, 2014). But merely providing scientific information related to the prenatal tests and helping women and families to understand the tests is not enough. The demand for counselling is increased as NIPT is introduced. Informed choice requires a comprehensive and thorough counselling in this problem-driven choice situation. Counseling services can be expanded in three ways. First, some counselling services regarding further tests should be offered before or during the initial screening and the possible result of the initial screening should be well explained beforehand. It may help to reduce the shock of women and families when they are informed with the need of further testing. Second, the theoretical information on the comparison between NIPT and conventional test methods is not enough for women and families to make informed choice. The possible results and following procedures, treatment and social services should be explained, so that women and families could be somehow prepared for the possible situations. Sensitive information, e.g. stories about how other women went through similar situations, may help pregnant women make easier decisions. Third, psychological counselling and support is required, especially during the weeks when women and families are waiting for the NIPT result. Stress, depression and anxiety are harmful for the women's health and fetus development. Women undergoing prenatal diagnostic procedures experience more psychological distress (Suzumori et al., 2014), which cannot be underestimated. It is important to listen to women's worries and give enough psychological support.

The problem of mass customization emerges when there are more options and more specific genetic information available, because this information cannot be rationally used by the consumers without appropriate counselling and help, which in turn brings more costs for organizing the services. We consider that there are many ways to solve the efficiency problems related to the need for increased counselling and one of them is to create a trust-inducing environment, a facilitated network based on powerful online tools and platforms, where women and families, practitioners, and relevant third parties co-create and add value by sharing their personal and professional information about prenatal testing and maternal care. This would be a sophisticated decision-making support platform and a research center that also connects similar cases, patients struggling with same kind of concerns, with each other, and hence addresses the psychological counselling issues. This type of establishment of supported networks, based on the willingness of mothers and families who have experience of further tests, will bring benefits: more experiential information from users and more social support. It is crucial for attaining larger value networks and better innovation diffusion to open more channels to discuss NIPT and the user's experiences.

6. Conclusions

6.1. Summary and contribution

This study provides important insights about the introduction of NIPT into prenatal care. NIPT is supposed to be a powerful screening test, appreciated by users and practitioners alike for its non-invasiveness. However, with this study, we discover the "invasive" elements in its application. We identify both the opportunities and problems related to the introduction and implementation of this new innovative service based on NIPT technology. This study demonstrates that NIPT introduces new challenges for pregnant women in decision making and for healthcare practitioners who are concerned about service efficiency and productivity, especially regarding the mass customization dilemma. These findings call for effective mechanisms to ensure that pregnant women or families are psychologically and intelligently prepared to make informed decisions about NIPT and improve the service operation and provision with the introduction of NIPT. Our proposal is that comprehensive and thorough counselling should be tightly integrated to the supported peer-to-peer networks as a way to organize service production and delivery. The new service production process, increasingly based on precision medicine, is moving from intuitive solution shops to supported peer-to-peer networks. In these networks the users can find directly comparable cases and this is one of the ways to solve the mass customization and patient choice dilemmas. The results of this research can be employed to handle management and choice challenges in maternal and natal health care service production that involves the use of new genomic innovations.

6.2. Limitations and further research

However, we acknowledge that the study has some relevant limitations that should be considered. The results of qualitative research can give indications as to the why, how and when, and gain familiarity of the research problem for further experimentation and hypothesis development, but generalizations cannot be made based on a case study and caution must be exercised when interpreting qualitative data from the literature review and the interviews.

As NIPT is in its early stages of clinical integration into prenatal care, the responses of participants may change once the screen becomes more widely available. Further studies will be needed to examine the findings among larger and more diverse populations and as the noninvasive platform for prenatal testing evolves. Further studies are also warranted regarding the diffusion of potentially disruptive genomic innovations in other healthcare areas. Although the findings may be limited to our sample population, the data provide important insight into the educational, management and decision-making components necessary for informed uptake of this new technology.

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The impact of service robotics on service work within a healthcare service system

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Demographic change nowadays has more and more influences on the health care sector. Less nursing staff face more and more patients and elderly people. Those changes on work processes can be observed in the area of prevention but also in the field of medical and elderly care. Technical support in the sense of IT is considered as helpful to support documentation. Nevertheless, support is still required concerning physical interaction in nursing and elderly care. The proposed solution in the paper at hand describes the potentials of service robotics for complex service systems in healthcare, also describing the mutual influences between the possible applications of service robotics and the changes in service work.

1. About the project “SeRoDi”

The staff in the health care system, especially for nurses for the elderly and in hospital, can benefit from modern robotic technologies. Robotics may disburden them from routine jobs and help at physically exhausting tasks. Currently, nursing staff needs about 20 percent of their working time for jobs which are not about care, but about transporting waste or dirty laundry (cf. Simon et al., 2005). This means that the physical and mental stress is high for the nurses. Through service robotics, this stress can be reduced. Patients and residents can benefit from the use of service robotics as the service robotics may help them in their daily life or give cognitive stimulation.

This situation is the initial position for the research project “SeRoDi” which is an acronym for the German expression for “Service robotics for supporting personal services”. The SeRoDi project is funded by the German Federal Ministry of Education and Research (BMBF). Six project partners (four research institutions and universities, a clinic and a retirement home) work on this project, starting in November 2014 until October 2018.

The project focuses on three topics. One focus is the purchase of automated guided vehicles (AGV) which are already in use in big clinics in particular for transporting food, laundry or waste in areas without patients. These AGV will be further developed and be made to assistants for nurses or patients and residents. Another focus in the project is which consequences the use of such technology has on nurses and patients. It is analysed what the technology means for the working conditions, the workload and support opportunities of the nurses, but also for the quality of care and for the acceptance of technology. The next focus is the service research perspective. It is analysed which part of the service system could be supported by service robotics and how service processes will change. The use of service robotics will have consequences for the productivity and the quality of the work.

This last mentioned focus is the topic of the paper at hand. It raises following questions:

- How does the service system change through the development and use of service robotics?
- How does service robotics influence the interaction in the field of medical and elderly care?
- In which parts of the processes in medical and elderly care are potentials for improvements through service robotics?
- Where and how can the productivity and also the quality be raised?
- Which mutual correlations can be observed between the technological development and configuration of the (modular) service robotics, the service work and the design of the overall service system?

These questions should be answered during the project span. This paper deals with a first insight in some of these questions.

2. Methodology

First of all, it had to be decided which kind of service robotics in the form of a mobile care assistant should be tested in the involved clinic and in the retirement home. Additionally, it was important to get first insights in a typical workday, in the service processes and in the use of the originally, non-automated medical trolleys, as these should be transformed to automated guided vehicles. In order to find this out, a three day visit for the research partners in the clinic and the retirement home was organised, followed by feedback workshops.

As a next step, the service robotics are being developed, which will be ready for a first test use in January 2016. In order to be able to compare the work situation and the service processes before and after the use of the service robotics, a set of surveys is necessary. These service instruments are being developed and discussed with the clinic and retirement home. The surveys will be conducted in autumn 2015.

One part of these surveys will be the so called “three component model”, which is a process modelling method developed by the Fraunhofer Institute for Industrial Engineering (Fraunhofer IAO) and the University of Greifswald. This method will help by analysing the service processes and by designing them new.

In the following sub-chapters, the steps are described in detail.

2.1. Visits in and workshops with the involved clinic and retirement home

To get a first insight in the service processes and in the use of the medical trolleys the research partners visited the clinic and the retirement home for three days in spring 2015. In teams of two persons the research partners accompanied the nurse

staff during their shifts. Like this, in the two facilities of the retirement home and in the involved ward in the clinic different shifts (early, late and night shift) were accompanied. The researchers were especially interested in finding out how much time is needed for the care, for administration or documentation, for transport and logistics etc., and which distances the nurses have to go in order to fulfil their jobs. For this purpose, the researchers had tablet PCs with an app (“ATracker”) with categories for different tasks where they could indicate the duration and the kind of tasks and add additional notes if necessary. This kind of documentation was not systematically and stringent, but should just be an assistance to note the first impressions. The tasks which were installed in the app belonged to different categories:

- Autonomous tasks: Tasks which are done by the service giver (here: the nurse), e.g.:
 - Documentation
 - Communication to other persons
 - Giving medicine
 - Cleaning up
 - Transport of goods
- Relational tasks: Tasks which are done in interaction between the service giver (here: the nurse) and the service receiver (here: the patient or the resident), e.g.:
 - Basic care
 - Curative care
 - Emergency care
 - Transport of patients
 - Ward round
 - Direct communication to patients and residents
- Heteronomous tasks: Tasks which prepare the service receiver (here: the patient or the resident) for an active collaboration, e.g.:
 - Information for patients and residents

Additionally, there were categories for other tasks which do not fit in the available categories, and for nonworking time.

Directly after the three days in the clinic and the retirement home, the project partners had short workshops with the nurses they had accompanied in the clinic and the retirement home. The aim of these workshops was to exchange the experiences from the nurses and researchers made in these three days. The researchers reported what they had noticed about the processes (what seems to work well, where could the nurses need support), and the nurses commented on it. Although these workshops were quite unstructured and without preparation (as they were conducted in-

stantaneous after the three days), first opportunities for the use of an automated guided medical trolley turned out.

In the weeks after this visit and first workshops, the researchers developed a first rough process model for typical service processes in the clinic and in the retirement home, based on the information from the visit. The processes are defined with the “three component model”, which will be explained in chapter 2.3., and visualised with “yEd Graph Editor”.

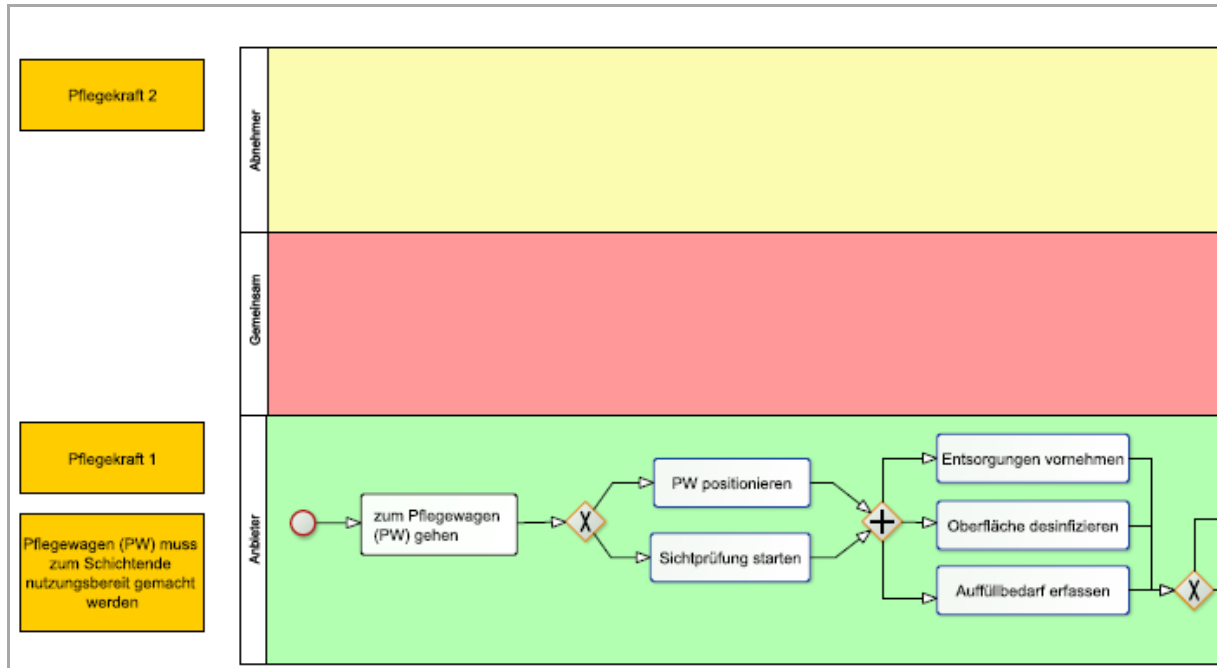


Figure 1: Extract from process model

For the clinic, two processes were visualised. Both of them are about the use of the medical trolley. The first process is how the nurses check the content of the trolley at the end of their shift, refill it and prepare it for the next shift. The other process is about the use of the medical trolley when they care for the patients during their shift. The process which was visualised for the retirement home was about how the trolleys with the laundry are used in case that a resident has to be changed and the bed has to be made up with fresh sheets.

For the clinic, it was soon clear, that the medical trolley will be automated and that the process from filling, using and refilling the trolley will be focused. In the retirement home, the decision was more difficult, as there exist many different trolleys which could be automated, e.g. for clean laundry, for dirty laundry, for dishes, for waste.

The researchers prepared additional workshops, one with experts from the clinic, and one with experts from the retirement home. For these workshops, they further developed the focused process for the clinic and suggested three processes for the retirement home. The processes for the retirement home were the following: The use and refilling of the trolley with the clean laundry, the use of the trolley for the dirty laundry and the disposal, the use of a new trolley which contains a basic accoutrement with laundry and offers enough space for the medicine which is needed in a ward round.

In the first workshop, the researchers and the experts from the clinic discussed the idea and the requirements of the clinic for an automated trolley. In the second workshop, the researchers and the experts from the retirement home discussed which trolley from the three ideas is the most useful if it is automated. The experts favoured the third idea with an automated trolley which the nursing staff can take with them when they care for the residents and distribute the medicine.

2.2. Development of survey instruments

After the processes were defined in which automated trolleys shall be tested, the technical partners started with the development and construction of the trolleys under consideration of the requirements from the clinic and retirement home.

The other research partners started the development of the survey instruments. The aim of the surveys is to record the service processes before and after the use of automated trolleys in order to be able to redesign service processes later on. As it is likely that the use of automated trolleys changes the daily work of the nursing staff, changes in the service processes concerning quality and productivity are possible.

In a first step, survey instruments for the analysis of the current situation without automated trolleys are developed. The surveys shall be conducted between October and December 2015, as the test of the automated trolleys will in January 2016.

For the following process steps in the clinic, survey instruments are needed:

- (1) The allocation of care materials at the ward
- (2) Filling the medical trolley with material at the beginning of the shift
- (3) Using the trolley
- (4) Checking the stock of materials and order

At the current stage of the project, the survey instruments are being planned and developed by the research partners and will then be discussed with the participating clinic and retirement home in a workshop. For this reason, at this point of time, the paper can only give a rough idea about the planned survey instruments.

For the first process step “the allocation of care materials at the ward”, it will be observed several times how the care material which is delivered once a week through the automated goods transport system is put away and ranged in the different stores at the ward. It should be found out how much different material is currently stored, how big the packaging units are and which material is ranged in which of the stores and why. These questions are crucial in order to find out how the filling of the medical trolley could be improved in the future, e.g. by ordering smaller packages which fit better in the trolley or by a modified storing which reduces the ways between different stores.

For the second process step “filling the medical trolley with material at the beginning of the shift”, there will also be observations. At the end of the shifts the trolley is re-filled with the material which has been used and expended. These situations will be observed several times and it will be recorded which materials must be refilled and

from which store it is taken. Additionally, in a workshop with a couple of nurses or in individual interviews the nurses will be asked about typical problems and incidents at the refilling process and about ideas for improvement.

For the third process step “using the trolley”, a couple of methods is planned. First of all, the use of the medical trolley is observed. For this purpose, the trolley and/or the nurse is fit with electronic devices which record for example the length of distances, the time needed, the distance between nurse and trolley or the pulse. Additionally, a structured questionnaire is to be filled in by the nurses about the stress and strain at the workplace and about the acceptance of automated systems in the health care system. Then another questionnaire is filled in by the head nurse about the organisation of the ward (cf. Hasselhorn, Müller, 2005). The aim is to analyse and evaluate the organisation of the ward in order to find out how the organisation could change through the use of automated trolleys and how this would be accepted.

For the last and forth process step “checking the stock of materials and order”, documents about the orders of material from the last twelve months will be analysed in order to find out which material is needed in which amount over a period of time. This could give hints how the storage could be reduced and which material is currently not stored in the trolley although it is constantly needed. Additionally, the person in charge for the orders (normally the head nurse) is interviewed about the characteristics, routines and possible changes in checking and ordering materials.

From all these analyses and data, process models will be developed for the four different processes. These models will be created with the three component model, which is explained in 2.3. The process models are discussed in a workshop with responsible persons from the clinic (e.g. head nurse, health care leader) to check if the processes are correctly represented and to change them where necessary. In a second part of the workshop, the processes are discussed with regard to possible improvements regarding quality and productivity, especially, but not only, through the use of automated medical trolleys.

For the processes in the retirement home, similar survey instruments should be applied, although the process steps differ somewhat. In the retirement home, the trolley which will be automated in future is currently used only for the transport of laundry. It is planned to automate it and to make it to a trolley which contains additionally basic care materials and, if possible, medicine. Thus the current processes which are object of the analyses are the following:

- (1) Taking the laundry from the basement to the storage in the residential area
- (2) Filling the trolley with the laundry
- (3) Using the trolley
- (4) Taking the used laundry into the basement where it is collected and brought to the washhouse

Like in the clinic, the instruments will be observations, interviews and workshops. At the current stage of the project, the detailed planning about the instruments is not as advanced as for the clinic.

These surveys aim at the representation of the current processes without automated trolleys. The surveys will be conducted between October and December 2015. At the

beginning of 2016, the automated trolleys, which are being developed, will be experimentally implemented in the clinic and in the retirement home for a couple of weeks. While and after this experimental use, the next survey unit will be conducted in order to record the future processes. The survey instruments will be developed in the further course of the project.

2.3. The three component model

The three component model is a process modelling method which subdivides different process parts into three components.

In the service process, the provider and the customer refer to each other. They mutually control their constructive action. For service providers, it is characteristic that they need to integrate the customer. They are reliant on the cooperation of the customers. To be able to offer the service, it is for example necessary that the customer is present at a specific place to a specific time, or that he gives certain information (cf. Bornewasser et al.; 2014).

Every service process consists of sub-steps, which are corporately generated by provider and customer. Some sub-steps are generated by the provider, some by the customer and some by both together. Consequently, three different components of the service work can be distinguished: activities, which conduct the provider, activities, which conduct the provider together with the customer and activities, for which the provider gives instructions to the customer (cf. Bornewasser et al., 2015).

The first mentioned activities are the **autonomous** component of the model. The second mentioned activities are the **relational** component. And the last activities are the **heteronomous** component.

The provider is in an autonomous position, and the customer temporarily resigns his right of proposal because he expects to satisfy his needs in this way. There are never two autonomous partners in a service situation. It is always one autonomous partner who gives specifications and, relational to this partner, a heteronomous partner, who is integrated into the service. He can participate, he can disturb or he can quit the system. Concerning these decisions he is quite autonomously, but as soon as he engages in the service, he is heteronomously governed by the other partner (cf. Bornewasser et al., 2015).

This approach leads to a structured representation or model of service processes. The model contains three stripes. In the green stripe, all the process steps which the provider conducts autonomously, are recorded, in the red stripe, all the collective made steps, which are coordinated by the provider, are recorded, and in the yellow stripe the heteronomous process steps, which are conducted by the customer, are recorded (see figure 2).

Abnehmer	
Gemeinsam	
Anbieter	

Figure 2: Empty pattern for three component model (cf. Bornewasser et al., 2015)

In this model, all process steps should be registered in chronological order and categorized in the three stripes.

The aim is now to improve service processes, which means to increase the productivity without downgrading quality. Originally, productivity means the proportion between output and input (cf. Ganz et al., 2013). The productivity could be increased in different ways: the same result could be achieved in less time or with fewer resources or with less process steps (cf. Bornewasser et al., 2015). But a process oriented productivity definition focuses on the analysis of the service process with all its steps and the question, if the current arrangement should be kept or changed, in other words, if the process should be reorganised. For the three component model, it is also important to decide how the process steps should be distributed in the different components (stripes) (cf. Bornewasser et al., 2015).

For those service steps which are conducted only by the provider and which the customer does not notice, many productivity rules from the industry can be adopted. But if the provider acts together with a customer or if the provider delegates process steps to the customer, the customer needs, customer wishes and the customer contact must be considered. This means that in services the relational parts should be as little as possible, as far as it does not impair the customer wishes. The steps in the relational component (the red stripe) should be changed and made to heteronomous steps (which requires good and precise instructions from the provider to the customer) or to autonomous steps.

In summary, productivity of services results from three aspects (cf. Bornewasser et al., 2015):

- Service providers improve or automate components which they can design on their own.
- Service providers explain the customers how the service process works and navigate the customer through the process.
- Service providers design all the cooperative and interactive service steps in a professional way and replace the direct parts with indirect parts (for example information via electronic devices or guide signs instead of personal communication).

The three component model will be used for the visualisation of the processes in the clinic and in the retirement home. With the rules for productivity and quality in mind, suggestions for further improvements of the processes and a reasonable implementation of the automated trolleys are made.

3. Summary and conclusion

The experience in the project so far showed that it is important to get a first impression of the processes in the facilities in question before starting with concrete and structured surveys and that the technical possibilities and the needs of the facilities have to be balanced permanently.

This is why the research partners first of all visited the clinic and the retirement home impartial and then identified together with the experts from the facilities the processes which should be further analysed and in which an automated trolley could be integrated. The functions which shall have the automated trolley are developed in the field of the technical possibilities and the requirements of the facilities.

With the three component model, a suitable method is found to visualise the current processes and to find point where the process could be improved by automated trolleys or just by the change of service steps.

4. Acknowledgements

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E3: KIBS and learning in clusters and networks

Chair: Morten Boesen

XXV. International RESER Conference: Learning in value networks as a challenge for digitalized service innovations

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The digital era revolutionizes traditional hierarchical and sector-specific service provision: roles of professionals and employees, organizations and managerial practices are changed. Digitalization calls for new forms of institutional change and learning. The aim of the paper is to outline an intervention method for enhancing inter-organizational learning in value networks. The paper explores how organizational learning theories have been present in discussion on co-creation of value networks and ecosystem management so far. It elaborates and makes the learning process explicit based on theory of expansive learning.

1. Introduction

The digital era revolutionizes traditional hierarchical and sector-specific service provision: roles of professionals and employees, organizations and managerial practices are changed. Digitalization calls for *new forms of institutional change and learning*. View of single organization, service or profession does not make sense anymore. Social, economic and environmental challenges demand co-creation between service providers. There is a critical lack of research attention on management of digital disruptions in political, organizational, and professional levels.

Emergence of digitalization and mobile applications accelerates scale-up process of services and service systems, but complex relationships in the value network obfuscate the wider purpose of the services and their influence on everyday life of citizens. Who is in charge of potential negative effects and risks? Who should learn from impact of system innovations? Where is the locus of learning for complex value networks aiming at solutions for societal level problems? We claim that the development of new organizational and institutional forms in the digital era *needs new methods, models and arenas for collective, intentional learning and collaborative experimentation* in and between value networks.

The aim of the paper is to outline an intervention method for enhancing inter-organizational learning. The paper explores how organizational learning theories have been present in discussion on co-creation of value networks and ecosystem management so far. Potential risks as impediments and motivational factors as opportunities for learning are identified and weighed up based on previous literature. Ways of tackling the risks and preparing the arena ready for co-creative encounters and learning between value creators are discussed. Then, it elaborates and makes the learning process in a value network explicit with theory of expansive learning.

2. Everyday life of the citizen as a basis for digitalized service innovations

As service dominant (SD) logic becomes the prevailing way of organizing offerings, customers are considered as active co-creators of value adapting the service to their individual needs. Service suppliers' motivation is to understand and improve customers' mundane practices in order to create value for the customer. This means not only getting feedback from customers during the service, but even gaining understanding of where and how supplier's offerings fit customer's overall activities. Co-creation opportunities are integrated into the service itself, in supplier's encounters with the customers. Mobile services are designed to engage customers to co-create innovative goods, services and experiences. In certain industries, parts of the services are shifted to be the customers' own responsibility by re-distributing activities of the traditional value chain, such as in IKEA concept the customer is expected to do most of the assembly of the furniture. (Payne; Storbacka; Frow, 2008.)

The firm-centric view of constructing services is challenged by communities of connected, informed, empowered and active consumers. The quality of customer experience becomes dependent on how interactions for co-creation of value have been facilitated. Individual consumers need to have access to firm's knowledge. Co-creation needs transparency of processes and continuous dialog, this even leading into personalized understanding of the risk-benefits of different alternatives of the services. (Prahalad; Ramaswamy, 2004.)

Although this promise of co-creation within a single service is huge, we still have some doubts on how mundane needs of citizens guide service integrations. When we think new digital service innovations from the point of view of everyday life of the citizen and a potential user, we should even go further than SD and ask how digitalized services change the everyday life of the customer in the first place. Can the citizens really influence on offerings of the suppliers based on their needs or are they first offered a service which they then start to modify, although this is called a co-creation opportunity?

Understanding citizens' life in a holistic way, not only as a service user, may open a new perspective to innovating new services. For example understanding continuities, disruptions, rhythm and routines in everyday life of the elderly people could contribute to designing new service offerings for the elderly (Kivilehto; Ritala, 2014). Research on what kind of everyday life produces wellbeing of the citizen (Korvela; Tuomi-Gröhn, 2014) may draft another kind of 'big picture' on how and what services should be digitalized or what kind of services should be integrated.

The frontline employee's role representing dyadic customer-employee interactions is in transition in the complex and digitalized service environment. As service employees' role may seemingly fade away as a face-to-face servant when the technological interface pushes them into the back offices, they may adopt new roles as *innovators* of new services, *enablers*, helping customers using the technology or *coordinators*, taking care of the integration and bridge-building between different offerings. (Ostrom & al, 2015.) However, the focus of research and intervention efforts on frontline employees as service innovators has been scarce (Hasu; Saari; Mattelmäki, 2011; Saari; Lehtonen; Toivonen, 2015). Case studies so far indicate that empowering and allowing employees bring their customer knowhow and ideas into service innovating

increase preconditions for development, improve services and have positive influence on their wellbeing (Hasu & al., 2014; Honkaniemi; Lehtonen; Hasu, 2015). Employee's participation to learning between organisations in value networks could bring a significant breath of everyday life of themselves and their customers into interventions. Focus in *customers' mundane life* and how to provide customers and employees support to enable mutual learning processes is *the first challenge* for the intervention.

3. Trust and distrust in creation of new relationships

In the digitalized world, integration and knowledge sharing between service providers may be accelerated. Liquefying information resources enables novel integration of service offerings and changes the dynamics between organisations. ICT becomes like a nerve system enabling learning in the value network. Intermediaries turn into infomediaries, which support the value network and connect the provider organizations and thus bring all the resources available for the customer. However, supplier organization needs a new kind of strategy, including arguments with whom to network with. Both service research and innovation studies have identified trust between partners an avenue for shared efforts. Lack of trust in sharing critical information between partners may take place as a fundamental impediment to collaboration and systemic innovations. (Lusch; Vargo; Tanniru, 2010.) According to service innovation studies (Fuglsang, 2013), development of trust is a critical factor to determining whether actors begin and continue to collaborate with each other to accomplish an innovation.

How to build *trust and openness* in a value network is *the second challenge* for the learning intervention. Trust refers to "willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party." (Mayer; Davies; Schoorman, 1995, 712). In other words, when you trust someone, you are willing to take a risk, but you assume the intentions of the other party to be good. Since value networks are complex constellations of organisations, trust between parties make collaboration between them less formal. Formal agreements can be simpler, shorter and less specific. The focus of working together may be focused on acting more than monitoring the actions.

According to recent research on trust, it is not considered as a unidimensional construct. Instead trust and distrust can be seen to exist simultaneously. Trust contains a feeling of hope and willingness to become vulnerable to the trustee. While distrust contains fear and actions to buffer oneself from the conduct of the other party. In multiplex working relationships in modern organisations it might be most prevalent that collaborative parties have both sustained trust and distrust attitudes. Distrust allows us to set boundaries around another's behavior yet permitting the functional interaction. Scholars (Lewicki; McAllister; Bies, 1998) even think that healthy dose of both trust and distrust forms a productive tension between the collaborators leading into high performance.

While communication is increasingly becoming electronic in modern working life, we may ask is it possible that trust between parties emerges without face-to-face interaction? Research on comparison between electronic online negotiations and face-to

face communication prove that trust becomes milder and parties become less satisfied with their negotiation outcome in online negotiations (Naquin; Paulson, 2003). We may draw a conclusion from that creating a shared idea of a new service demands a chance of face-to-face communication between value creators. However, paradoxically, prospects of digitalized services rely often to an expectation that everything can be digitalized, even services traditionally based on human face-to-face interaction such as care, teaching or managing.

Trust can also be seen as an evolving phenomena in dyadic relationships. Study on network dyads in entrepreneurial settings has analysed the formation of a productive and successful alliance to be developing in three phases. In the first phase preconditions for exchange are established. Knowing each other from previous working history and knowing each other's reputation and competences reduces uncertainties and enhances early cooperation. In phase two conditions for mutual trust increase in safe spirit if partners move to developmental trial period in which the new idea or business is experimented in incremental way. One firm has to be the initiator, but the other must be willing to respond to the requests for gaining mutual engagement and trust. Mutual economic advantage is necessary but not sufficient rationales. In the third phase integration occurs in operational, strategic and social control levels. The partners become interdependent from each other. Strategic integration extends the collaboration from routine coordination to new joint projects to improve old or develop new products or services. (Larson, 1992.)

In the early development of a value network it may benefit from a presence of facilitators who help the participants generate new ideas and value (Fuglsang, 2013). Facilitators may provide a trust bridge between parties before they know or trust each other (Manring; Moore, 2006). Trust between parties could be an issue which could be worth of bringing into the consideration before starting the collaborative effort. However, as observations of evolution of the dyadic entrepreneurial relationship indicated, trust is something which will grow along the shared effort.

4. Societal problem as a motive for intentional network learning

Many social, economic and environmental challenges are too big to be solved by individual product or service innovation created in individual organisations. Service research is currently facing the challenge of how to examine and develop innovations at the systemic level (Ostrom and al., 2015; Toivonen, 2015). Inter-organizational learning is needed when the problems to be solved are so complex and multifaceted that pre-existing power relations are not able to solve them. Although scholars of service research have recently used the concept of learning (e.g. Lusch; Vargo; Tanniru, 2010) in their texts, it has mainly referred to how firms could learn to serve a customer or how a firm could learn to become vital and sustaining part of the value network. Learning has been described as an adaptation process to customers' needs, which liquefying information resources via digital communication and computation has accelerated and shifted into macroscale without pondering whose intentions and motives are guiding the overall development of the service system. In service research, learning in the level of entire value network related to a societal problem is still waiting to be elaborated.

In the ecosystem management literature, in the area of sustainable development and nature ecosystems we may find studies dealing with inter-organisational learning and learning in networks (e.g. Manring, 2007; Mandell; Steelman, 2003; Manring; Moore, 2006). This literature points out that a transcendent vision and a unifying purpose among stakeholders is needed for generative learning. Previous power-relations between stakeholders may be re-formed by constructing a new sustained culture of decision making through consensus. In addition, a growing spiral of trust and nonhierarchical integration between stakeholders are important for promoting systemic change. (Manring, 2007.)

These empirical analyses of long term projects have used organisational learning theories to identify and outline the dynamics of their success. They have referred to organizational learning scholars such as Chris Argyris and Donald Schön (1978), Mark Easterby-Smith and Marjorie Lyles (2003) and Peter Senge (1990), who are concerned on explanatory mechanisms for success and failure in organizational renewal from the managerial perspective. However, this literature does not guide what kind of method or facilitation could lead into inter-organisational learning and productive co-creation between stakeholders.

Theory of expansive learning derived from cultural-historical activity theory provides an avenue for the interventionist framework. In activity theory, the concept of object is central (Leont'ev, 1978). The object embodies the meaning, the motive and the purpose of a collective activity system or even systems. Different participants take different partial perspectives on the object, it is internally contradictory and constantly changing. In network context we may say that the concept of object is resembling the notion of shared vision, but the notion of object is theoretically more grounded (Miettinen, 2005).

Expansive learning in a community begins when, during the course of activity, some individuals begin to question the current goals, patterns and norms, even the basic motive/need of the activity, and search for new practices. In some cases, this escalates into collaborative envisioning and a deliberate collective change effort at grass-roots level (Engeström 1999, 2001a, 2001b), after which a new motive and expansive cycle follows. Engeström (1987) proposed this as a new form of learning: *expansive learning* of cultural patterns of activity that do not yet exist, and which therefore involves *horizontal or sideways* learning and development (Engeström 2001a, 2001b). Individuals' and groups' transformative agency, their intentions to make a change, are at the core of expansive learning even in multilevel inter-organisational innovation processes (e.g. Toiviainen, 2007) and in new forms of collaboration (Engeström; Kajamaa; Lahtinen; Sannino 2015).

The third challenge for the intervention is to persuade and stimulate potential actors *to co-create/ find an ambitious shared vision or object that potentially solves a societal level problem*. To make the vision or shared object doable we should define an experiment of the new activity to test it in a concrete way.

5. Learning in value networks as a new method

5.1 The learning process as an intervention in a value network

Interventions enhancing employee-driven innovating from bottom-up in a service organization based on practice-based learning (Ellström, 2010) activity theory and human-centred service design (Hasu and al. 2014) pave the way for learning in a multi-actor-network inside an organisation. However, an intervention between different organisations as value creators expands the focus into inter-organisational and societal level, without excluding the meaningful principles needed in learning in employee-driven innovation.

In the following, we present a method for learning in value networks, based on how to tackle the three previous challenges concerning including needs and holistic understanding of the users, trust between value creators and forming an ambitious shared object. Theoretical principles for the method derive from the expansive learning theory, but we aim to its novel practical solution. We describe first the methodological principles and then the phases of the intervention process.

Bringing the everyday life of citizens as a motive for change

This principle relies on the expectation that frontline employees and citizens using existing services bring an important perspective for altering the services both in incremental or radical way. Employees have often an in-depth understanding of the service from the user's perspective. Workshops are an arena for making this hidden knowledge explicit by letting employees play with different user roles. Human-centred design methods (e.g. Brown, 2009) offer many practical means for this. On the other hand, the everyday life of the citizens should be studied as such and used as a leverage for learning. Research interviews exploring the everyday life of e.g. young or elderly could provide a resource for opening needs of users from a more holistic perspective, not just as users of a single service. Learning in value network should include possibilities for users to become as co-innovators of their own services.

Investing on trustful relationships

As value networks tend to evolve more and more complex constellations of organisations, which have different mechanisms of making profit, building trust between them becomes critical. Hectic working life and digitalization has changed communication between organisations increasingly electronic (Naquin; Paulson, 2003), which may not be suitable and sufficient media for co-innovating, elaborating long term visions or building trust. Learning in a value network requires a chance to face-to-face interaction, time for encounters and reflecting different alternatives between value creators. Based on research of strategic alliances (Larson, 1992), there may be a tendency that a value network evolves around people who have a common working history or previous acquaintance. Facilitators should act as a trust bridge and bring also new value creators to the network.

Expanding the object of activity to system level

Persuading and stimulating potential actors to co-create/ find an ambitious shared vision or object that potentially solves a societal level problem is probably the most difficult challenge for the intervention. It may be triggered with the help of indicating

existing ruptures, disturbances and troubles leading into questioning of the present service, as suggested in developmental work research. Learning from more advanced examples or with more knowledgeable partners is another strategy. In the workshops, examples from other service contexts could be used as a leverage for collective insights. Policy-level actor who is concerned of national level impact of different developments should become a mentor for the entire value network for keeping the focus in wide perspective.

Reflexive learning through tool use and collective evaluation

Learning in a value network is enhanced by activity-theoretical classic principle of double stimulation (Vygotsky, 1978). The participants are offered practical but inherently conceptual tools for analysing and making sense their shared activity and for making intentional decisions how to proceed in their “zone of proximal development”. Developmental impact evaluation for innovation networks (Saari; Kallio, 2011) offers practical guidelines how to learn and evaluate in a network between researchers, users and policy actors. Collective evaluation of impact of services as well as evaluation of experiments representing future services serve as arenas for reflexive learning for the value networks.

The phases for learning in value networks are:

- 1) *Constructing the value networks*: In this phase researchers meet and interview potential value creators in each organization and discuss their current routinized work and horizons for change. Although a shared vision or object is not yet formed, the facilitators may involve unfamiliar value creators to the discussion. The aim of the first workshop, which is organized for each value network, is to build trust between potentially innovative value creators and play with alternative visions.
- 2) *Visioning for all the value networks*: Basis for visionary service integrations are searched in a workshop from mundane needs of the citizens. Service integration and digitalized service models are used to expand the horizon of the value networks. Each value network is guided to form a shared vision and become inspired by each other's aims. Each value network nominates and is provided with a societal actor as a mentor to guide the new digitalized service integration to become societally relevant, feasible and impactful.
- 3) *Learning between value networks*: In this phase researchers organize workshops between two local value networks which may learn ideas, ways of managing, ways of relating etc. from each other.
- 4) *Defining the innovative experiment by the value network*: In this phase each value network defines an experiment which implements the shared vision. Researchers help to explain the experiment in a form of a model, concept or prototype, in order to be able to gain support and wide understanding.
- 5) *Experimenting novel service integration*: In this phase each value network conducts a small-scale experiment, which may take 3-6 months. The experiment is realized together with the users of the service or services. The researchers follow the process and collect data on impact of the pilots in each value network.
- 6) *Developmental evaluation and scale up*: After the experiments have been finished, all the value networks are gathered to a workshop to reflect on what has been generated and to design how the scale-up of the novelty could be

organized. Societal level actors have a role in evaluating the potential wider impact of the novelties.

The learning process could be depicted as a cycle, in which learning between value creators and value networks is taking place. Experimenting phase focus more in learning with the users (Kallio; Lappalainen, 2014).

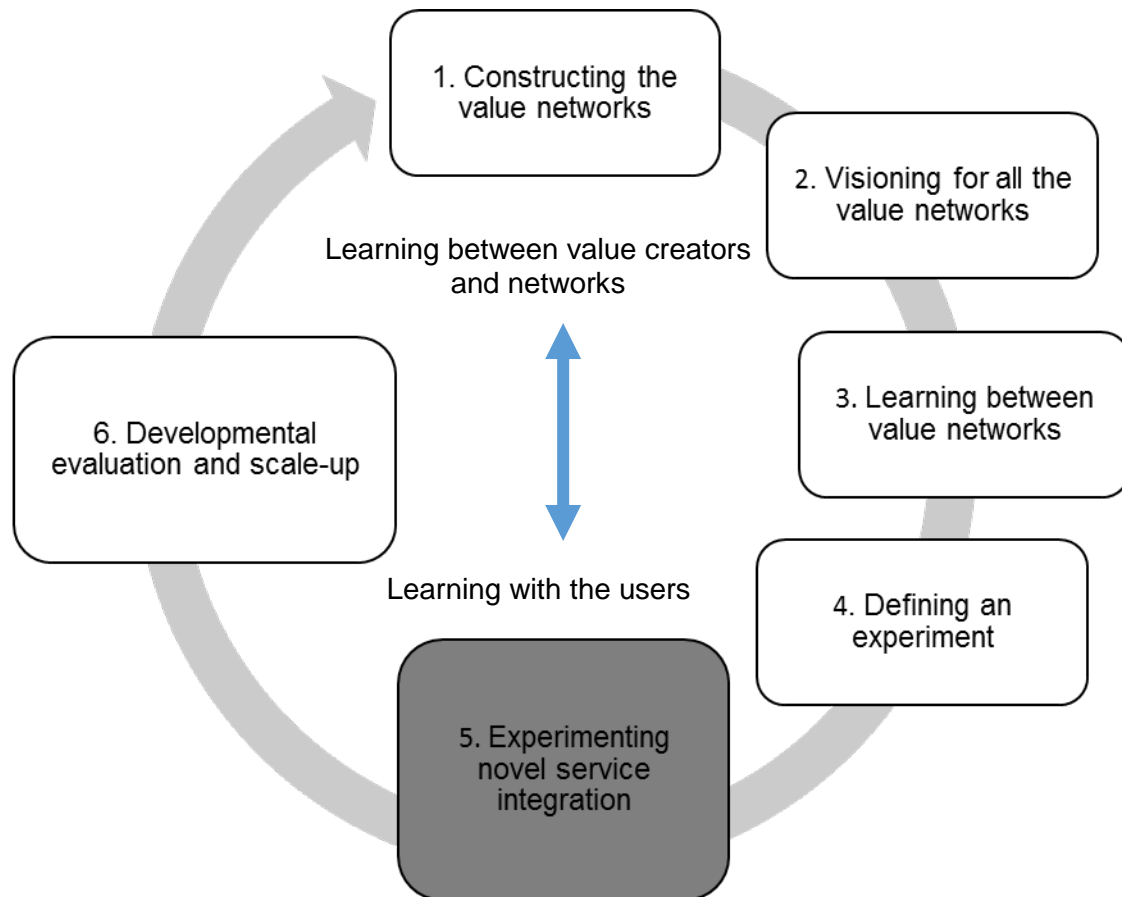


Figure 1: Learning in value networks as an intervention

5.2. Cases of complex value network as a locus of learning

In the project of the Revolution of Service Economy – Human Being at the Core of Digitalization (2015-2018), we will organize a learning process between 3-4 value networks. Value networks will co-create innovative experiments in 2016, within three domains; digitalized support services in health care, integrated wellbeing services for the citizens and digitalized learning at primary schools. In the following table we draft what are these value networks about and based on the preliminary interviews of the value creators how could we define their premises according to elements highlighted in the paper.

Value network	Whose needs in focus?	Value creators	Trust/ Distrust (in the beginning)	Potential societal value	Experiment of the new activity
Digitalized support services in health care	Medical doctors' need for quick online transcripts of diagnosis saving their time for saving lives Patients' need for understanding their own health records	-HUS Servis (support services), -HUS Servis in-house IT -HUS, Hospital district of Helsinki and Uusimaa -CGI (IT infrastructure) -Lingsoft (language model) -Arcusys (integration solutions) -ManPowerGroup (staffing in periods of overload)	Previous pilot project have created a feeling of trust between dyad HUS Servis-CGI	Transparent, quick, high quality on-line medical records between professionals and patients saving time, improving service and health	Digitalised medical records pilot 2 managed by HUS ? New expert role of the transcriber between MD and patients?
Integrated wellbeing center	Citizens, particularly elderly people's need for active, social and healthy everyday life	-Public primary health care -Public welfare services -Third sector associations providing recreational voluntary services -Security services -Housing and cleaning services for the elderly -CGI -In-house IT of public services -Peer guides to support learning to use mobile services	On-going integration development in single municipalities has constructed trust between professionals of primary health care and welfare services. Third sector still searching its way of acting. Peer guides have some feelings of distrust for the digitalization trend.	Saving taxpayers' money in organizing health care and welfare services. More holistic and proactive wellbeing services for the citizens Orienting elderly people for active and healthy life.	Wellbeing center pilots with mobile services in South Karelia Social and Health Care District
Digitalized primary school	Pupils' and families' need for actual, creative way of learning Teachers' need for new (digitalized) tools for teaching	-Pupils and families -Public primary school, nursery school, physical education -Edupoli (education services for adults and organisations) - Third sector services e.g. family care and sports - Digital platforms to enhance collaboration in networks	Previous pilot project has enhanced collaboration and trust across sectors, Ongoing renewals are based on collaboration and trust between municipality, pupils and families, Third sector searching its way of acting.	Educated children to become creative, critical and active knowledge creators for the future knowledge society, To enhance equality between citizens and prevent social exclusion	Integration of formal and informal education to support the learning in city of Vantaa Enhance the learning by novel digital platforms

Table 1: Critical elements for learning in a value network – preliminary expectations from the interviews

Value networks are constructed between partners who already know each other from previous project history or subcontracting relationships. Each value network becomes

a complex constellation in which trust is not divided evenly, but evolving along their collaboration as the table could be interpreted. In the intervention process, it could be revealing to make the relationships between value creators visible by analysing in depth what part of service is conducted with whom. In each of these cases the public service organization is the most dominating value creator and manager of the network. However, the entire network would benefit from opening up what is the potential societal value of the entire network, and how the future experiments implement it. In the table, the descriptions are researchers' constructions based on interviews of the parties. This kind of a table could work as a preliminary orienting tool for the emerging value networks to ponder together relevant elements for their learning and co-creation.

6. Conclusions

The paper explored how learning approach could support co-creation and novel service innovations in complex and emerging value networks in the era of digitalisation of services. We outlined three challenges for learning and intervention based on previous literature on value networks and inter-organisational learning.

First, a holistic understanding of everyday life of the citizens should guide innovating new digitalised and integrated services instead of reducing the idea of human needs only as users of a single services. Frontline employees' knowledge on customer-employee interactions should be included in innovating new service offerings. Second, building trust and managing distrust between value creators should be secured when constructing complex value networks. Co-innovating between value creators requires openness and transparency between partners. Third challenge for the value network is to create a shared vision or common object which potentially solves a societal level problem.

We proposed an intervention method based on expansive learning theory for learning in and between value networks. Since value networks often form around partners who already know each other, facilitators may work as a trust bridge for including unfamiliar value creators to co-innovating. Expanding the horizon to see what is not yet there, as an intentional collective learning effort of the entire value network may be leveraged by a facilitator and supported by a societal level policy maker. New tools for defining what a value network is and what it should aim at are needed. The paper developed a tool for intentional learning and orienting to the future.

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XXV. International RESER Conference:

KIBS and the Dynamics of Industrial Clusters: a Complex Adaptive Systems Approach

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Abstract

An important and highly debated question in economic geography is how to explain the dynamics of industrial clusters, i.e. their emergence and evolution through time. Two main theories are generally explored, without being confronted: the cluster life cycle theory - which mainly adopts an aggregate point of view - and the network-based approach. Although KIBS are an important actor of industrial clusters, these two theories pay little attention to them as a potential driver of clusters' dynamics.

We show in this paper that properly taking KIBS into account requires considering an alternative and integrative approach that conciliates these two theories. In particular, we argue that complex adaptive systems (CAS) constitute a promising basis for such a synthesis. We then operationalize the CAS approach by studying an existing industrial cluster - Skywin (aeronautics in Wallonia region, Belgium) - within this framework. For this purpose, we use an exhaustive list of the innovation projects undertaken within this cluster between 2006 and 2014 and we build temporal innovation networks linking the agents of the cluster. It appears that Skywin's innovation networks exhibit a small-world effect. This implies that any agent who takes part into an innovation project of this cluster can easily benefit from knowledge and information generated within another ongoing project. We argue that this effect is an interesting proxy of a cluster's attractiveness and an appropriate aggregate variable for studying clusters' dynamics as it shows cluster's potential for further growth. We also demonstrate that KIBS are the main responsible for the emergence of this small-world effect in Skywin's innovation networks.

Introduction

This paper aims at intertwining – in a theoretical and operational way – three strands of literature: (i) innovation through knowledge intensive business services (KIBS thereafter), (ii) industrial clusters' dynamics, and (iii) complex adaptive systems.

KIBS are services which are processing, generating, and diffusing knowledge within the economy, and as such they are largely regarded as important (co-)producers of innovations (Miles et al., 1995; Gadrey and Gallouj, 1998; Den Hertog, 2000; 2002; Gallouj, 2002), as well as a promising engine for economic growth (Desmarchelier et al., 2013a) and a key component of regional and national innovation systems (Muller and Zenker, 2001) and of technological and sectoral systems of innovation alike. Typical activities are training services, R&D, engineering services and consultancy in its various forms (technical or not). KIBS include both traditional professional services (such as legal services, audit and accountancy, market research, personnel services, management consultancy, etc.) and new technology based services. According to Miles et al. (1995), regarding “*their relation to new technology*”, compared to the latter, the former are “*users rather than agents in development and diffusion*” (p. 27) of new technologies. Universities are often not included into the broad category of KIBS (ex. Muller and Zenker, 2001; Miles et al., 1995). They have indeed many functions (e.g. teaching and fundamental/academic research), which are not directly oriented towards businesses’ technological (and non-technological) needs. However, some of their functions clearly fit into KIBS purposes, especially but not exclusively new technology based KIBS (ex. technical training, technical consultancy, business funded R-D, establishment of research centers in partnership with businesses) and industrial clusters’ studies very often highlight their central role in explaining clusters emergence (Saxenian, 1994; Audretsch and Feldman, 1996a; 1996b). The present study itself also underlines universities’ role in favoring the emergence of new technologies within an industrial cluster. In this paper we therefore include universities and research bodies within the KIBS category and the empirical part is mainly focused on such types of KIBS.

More generally, KIBS’ central role within successful industrial clusters has been emphasized since the birth of this latter concept. Indeed, in Porter’s words “*clusters are geographic concentrations of interconnected companies, specialized suppliers, service providers, firms in related industries, and associated institutions (e.g. universities, standard agencies, trade associations) in a particular field that compete but also cooperate*” (Porter, 2000, p.15). In this definition, KIBS enter mainly into the “*associated institutions*” category, as it includes “*universities, think-tanks, vocational training providers*” (p.17).

An important and highly debated question in economic geography is how to explain the dynamics of these clusters, i.e. their emergence and evolution through time (Frenken et al., 2015; Boschma and Fornhal, 2011). Two main theories are generally explored, without being confronted¹: the cluster life cycle theory (Menzel and Fornahl, 2010; Shin and Hassink, 2011; Audretsch and Feldman, 1996) - which adopts mainly

¹ A notable exception is to be found in Martin and Sunley (2011), whose contribution will be discussed in this paper.

an aggregate² point of view - and a network-based approach (Saxenian, 1994). Surprisingly, these two theories pay little attention to KIBS as a potential driver of clusters' dynamics.

We show in this paper that taking KIBS into account requires considering an alternative and integrative approach that conciliates these two theories. In particular, we argue that complex adaptive systems – or CAS - (Martin and Sunley, 2011; Holland, 2012) constitute a promising candidate for such a synthesis. Since these systems are mainly encountered into the theoretical literature (Dilaver et al., 2014; Albino et al., 2003; Squazzoni and Boero, 2002; Boero et al., 2004), we choose to justify our theoretical stance by studying KIBS' leading role within an existing industrial cluster, conceived as a CAS: Skywin (aeronautics in Wallonia region, Belgium).

The remaining of the paper is organized in two parts: we begin by discussing about the competing theories of clusters dynamics and we advocate for the CAS approach, then we conduct our empirical analysis in order to illustrate the usefulness of this theoretical stance.

1. Life Cycle Theory vs. Network-Based Approach: the need for a synthesis

a. From product and industry life cycles to cluster life cycle

The life cycle hypothesis in economics and management literature is, in its original form, a descriptive model aiming at synthesizing in a coherent manner a wide variety of stylized facts about the evolution through time of the marketed products.

Pioneers of the Product Life Cycle (PLC) theory, Utterback and Abernathy (1975) portray product evolution in three successive steps: (i) the “uncoordinated process”, within which firms undertake mainly product innovations aiming at improving their technical performance, (ii) the “segmental process”, where firms modify minor characteristics for increasing product variety and earning market shares, then (iii) the ‘systemic process’ where innovation efforts focus on reducing production costs. These three phases are also and more often labeled: “fluid”, “transition” and “specific” phases (Abernathy and Utterback, 1978). Even though authors claim that “*there is reason to believe that in any cases the progression may stop for long periods, or even reverse*” (Utterback, and Abernathy, p. 645), they insist on the high degree of predictability/determinism in the way products evolve through time. Klepper (1996, 1997) systematizes this PLC into a model of Industry Life Cycle within which firms’

² This means that the age of the cluster is proxied by just one (or a limited number of) variable(s), which can be for example the number of employees or the number of firms, etc.

entries, exit, growth and innovations in “*technologically progressive industries*” (p. 564) are the driving forces behind the PLC.

The general character of this theory has been challenged by the advent of service economies. In particular, Barras (1986) points out the existence of a “reverse product cycle” (RPC) within service sectors. In this view, service firms acquire innovations (mainly information technologies) coming from manufacturing sectors firstly for improving the efficiency of service operations. Then comes the stage of service quality improvement, and eventually the production of totally new services. The PLC is supposed to be reversed as far as process innovations precede product innovation in the cycle. Likewise, this life cycle theory of the innovation dynamics in services proved to be incomplete. Gallouj (1998) argues that it reflects a “*technological bias*” (p. 128): indeed in Barras model (1986), services cannot innovate by themselves as their innovations mainly come from the use of the so-called “enabling technologies”, i.e. information technologies. Non-technological forms of innovation which are important in services and which concern not only the organization and the process but also the product are not taken into account by the RPC theory. In contrast, Gallouj (1998) finds that many KIBS perform several types of non-technological innovation including “ad hoc” innovations, i.e. custom made innovations adapted to their clients’ needs.

Gallouj and Weinstein (1997) proposed a more complete view of firms’ innovations (whether they originate from industry or services). Adopting a characteristics-based approach of the product – good or service – conceived as a set of technical and service characteristics³, they identify six different modes of innovation: radical, improvement, incremental, ad hoc, recombinative and formalization (see Gallouj and Weinstein, 1997 for details). These six modes are not exclusive to each other nor a priori ordered in a pre-determined sequence. Another important point as regards the life cycle theory is that, according to the authors, the PLC encompasses only “one point of entry” for innovations: the technical characteristics of the product. It follows that the Life Cycle conception offers a limited and deterministic view of innovation dynamics. Nevertheless, it is a popular metaphor for reporting industrial clusters’ evolutions.

A first exploration of the Life Cycle theory applied to industrial clusters is undertaken by Audretsch and Feldman (1996a; 1996b). According to them, the main driver of firms’ agglomeration is the low transferability of tacit knowledge through long distances. Following Klepper’s Industry Life cycle, they postulate that tacit/ localized knowledge is important in early developments of a given industry, fostering a certain degree of firms’ agglomeration. However, as the industry becomes mature, a dominant design emerges and the product becomes standardized. Firms thus mainly rely on codified knowledge and information, which are easy to share in long

³ In the Lancasterian tradition (Lancaster, 1966, Saviotti and Metcalfe, 1984)

distances. The initial clustering is thus replaced by a movement of firms' dispersion when the industry reaches maturity.

Even though KIBS are not explicitly mentioned by Audretsch and Feldman (1996a; 1996b), universities are seen by these authors as an important source of tacit knowledge and are thus a key focal point for early clusters' developments. Moreover, knowledge codification process appears to be the driving force of the life cycle. Arguably, services and KIBS in particular are major actors in knowledge processing (Gallouj, 2002) and transmission (Miles et al., 1995; Lau and Lo, 2015) and should thus be regarded as key actors in explaining clusters' evolution. This service-friendly theory is questioned by Klepper (2010), who rather emphasizes the role of a "spinoff process", that is of the emergence of "*firms with one or more founders that previously worked at another firm*" (p. 16).

Menzel and Fornahl (2010) for their part also propose a knowledge-driven clusters' life cycle theory, summarized in Figure 1. Two dimensions of the cluster are considered: the number of employees and the heterogeneity of "accessible knowledge". The main driver of the cluster life cycle, addressed in terms of number of employees, is a gradual process of knowledge homogenization among the members of the cluster. Although similar to Audretsch and Feldman's approach (1996a; 1996b) by the role it attributes to the nature of knowledge in the dynamics of the cluster, this theory has the advantage to avoid too deterministic evolutions from emergence to death, since clusters can always enter into loops of self-sustainment, successive cycles of growth and decline, or even re-orient themselves through a process of "transformation". This adaptability is determined by the degree of knowledge heterogeneity and by the openness to new comers of incumbent firms' networks.

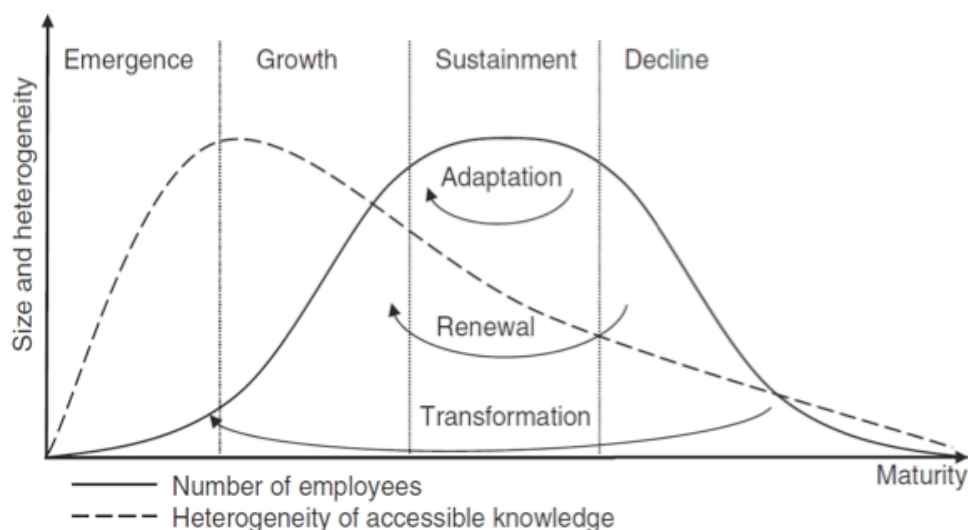


Figure 1: Knowledge-based cluster life cycle (from Menzel and Fornahl, 2010 p. 218)

Interestingly, cluster life cycle theory has moved away from the original product and industry life cycles, as it becomes less deterministic and more influenced by local

drivers, notably clusters' ability to maintain a healthy degree of knowledge heterogeneity (especially through new entrant firms or new "imported" technologies). At the opposite of Audretsch and Feldman (1996a; 1996b), for whom clusters' life cycles are "shaped" by the industries that they belong to, Menzel and Fornahl (2010) consider clusters as more independent entities. However, we argue that this approach remains too restrictive and deterministic since, at least for incumbent cluster agents, it considers only one kind of innovation trajectory, i.e. only one kind of knowledge processing mode, namely: formalization (Gallouj, 2002). Actually, "renewal", "adaptation" and "transformation", i.e. the reverse innovation trajectory or knowledge processing mode (namely differentiation/localization) (Figure 1) are only possible through "external knowledge" (Menzel and Fornahl, 2010 p. 229), thus through exogenous/unexplained factors.

More generally (and beyond Menzel and Fornahl's contribution) another point of criticism towards the life cycle theory is that it gives too few importance to cluster's actors in explaining aggregate dynamics. Indeed, this approach generally considers the cluster – i.e. an aggregation of heterogeneous actors – as a relevant decision maker. Following Martin and Sunley (2011), one can wonder whether "products, technologies, industries and clusters [can] be treated as if they are the economic equivalent of biological organisms" (p. 1301). Besides, even though universities are sometimes cited in early clusters' dynamics (Audretsch and Feldman, 1996a; 1996b), the main actors mentioned are very often the "firms", but we neither know which primary sector of activity they belong to (or whether they all belong to the same sector) nor the nature of the interactions they entertain between each other. Klepper (2010) "spinoff process" is clearer on this point, since spinoffs generally belong to the same sector as the original company – or as the research team in the case of university spin-offs - and are, at first, of smaller size. The exclusive focus on firms is not satisfactory for addressing the clusters dynamics. Indeed, according to Porter (2000), firms are also supported by a number of "*associated institutions*" within clusters, mainly "*universities, think-tanks, vocational training providers*" (p. 17). Regarding the account for the diversity of the actors involved, the network-based approaches are obviously more appropriate.

b. Networks and clusters dynamics

An alternative explanation of clusters' dynamics is focusing on their internal organization in the form of networks of interacting entities. According to Newman (2003, p. 2), "a network is a set of items [called] vertices or sometimes nodes, with connections between them, called edges. Systems taking the form of networks abound in the world". Within clusters, nodes are companies and supporting institutions and the edges are all kind of relations between these actors: common investments in R&D, involvements in the same production processes, common patents or shared resources, etc. However, the network is not only a structure, it is also a mode of coordination that fits between market and hierarchy. From an innovation perspective, the network is considered as a coordination mode that is

more effective than both market and hierarchy. Indeed resorting to the market assumes the establishment of explicit contracts, while in the field of research and innovation, projects are highly complex and uncertain. This makes it difficult to establish explicit contracts, which furthermore raise the risk that strategic secrets might be divulged (Hakansson, 1989; Callon, 1991; Hakansson and Johansson, 1993). The hierarchy for its part reduces transaction costs but involves the risk of bureaucratisation, which (as already foreseen by Schumpeter) may be prejudicial to innovation. In this network tradition, one can mention here Saxenian's (1994) seminal work, comparing the "*network*" or system-based Silicon Valley and the "*independent firms-based*" Route 128. Saxenian argues that this is the prevalence of horizontal networks between firms and research institutions (e.g. Stanford) in Silicon Valley that allowed this cluster to successfully switch from semiconductors to microcomputers during the 1980s, whereas independent firms in Route 128 failed to adapt to the new technological conditions of that time. An horizontal network is in Saxenian's words a set of actors who "*deepen their own capabilities by specializing*" (p. 4), thus whose links are different from just input-output flows.

An interesting observation here is that, in a network perspective, clusters exist and develop because of a specialization process, which is the opposite of the knowledge homogenization generally invoked by the Life cycle literature. However, KIBS can be drivers of both dynamics: formalization of existing tacit knowledge or generation of custom-made (specialized) knowledge (Gallouj, 2002). It follows that if we recognize that KIBS are active members of industrial clusters, we have to acknowledge that both dynamics are possible. This remark about KIBS advocates for an integrative approach recognizing the influence of actors' interactions on the direction taken over time by the cluster as a whole. We argue in the following that Complex Adaptive Systems (CAS) allows integrating, within a single framework, both the aggregate perspective of the life cycle theory and the micro (or multi-agents based) perspective of the network-based approach, without falling into deterministic predictions.

c. Complex Adaptive Systems: towards and integration of network and life cycle perspectives

Martin and Sunley (2011) recently proposed to consider industrial clusters as a particular type of CAS. According to them, a CAS is a system "*made up of numerous components with functions and inter-relationships that imbue the system as a whole with a particular identity and a degree of connectivity or connectedness*" (p. 1303). Furthermore, a CAS is "characterized by non-linear dynamics because of various feedbacks and self-reinforcing interactions amongst component (...). It is also characterized by emergence and self-organization". However, reading from these authors, it is not clear what improvements these CAS bring to Saxenian's network-based framework (Saxenian, 1994) nor to the Life Cycle theory discussed above. Indeed, Martin and Sunley (2011) use a typology of "*meta-models*" covering the various forms of CAS dynamics (inspired by Cumming and Collier, 2005). These meta-models range from deterministic (traditional) life cycles to totally random walks.



5 The “adaptive cycle model of the evolution of a complex system” (Martin and Sunley, 2011 p.1307) is similar to the “modified adaptive cycle” represented in Figure 2, minus the alternative trajectories of “failure”, “constant cluster mutation”, “cluster disappearance”, “cluster stabilization” and “cluster re-orientation”.

Although we point out limitations of Martin and Sunley's (2011) adaptive cycle, we find very relevant their proposition to rely on CAS for conceptualizing clusters' functioning and dynamics. Rather than trying to classify such systems, we consider that a general definition and a list of properties can justify this point of view.

According to Holland (2012) a CAS *"consists of a multitude of interacting components called agents [...]. The agents are diverse rather than standardized, and both their behavior and their structure change as they interact"* (p. 57). Furthermore CAS display the following three main features:

1. *"There is no universal competitor or global optimum in a CAS"* (p. 58).
2. *"Innovation is a regular feature of CAS"* (p. 58).
3. *"In a CAS, anticipations change the course of the system"* (p. 60).

Clusters' network structure has already been documented by many authors, including Porter (1998; 2000) and Saxenian (1994). All of them focus on the diversities of the "agents" involved: firms, universities, think-tanks, etc. It might thus be argued that, as structures, clusters are examples of CAS. But do they share CAS properties?

Applied to clusters, the first characteristic mentioned above implies (i) that networks of agents can be found in many technological or market niches, and (ii) that cooperation between specialized agents can always allow for improvements. The remark about niches is particularly relevant for clusters, since the clustering phenomenon reflects a tendency towards regional specializations in very distinctive activities including vine production, sportswear, semiconductors, etc.

Regarding the second characteristic, evidence shows that, within clusters, agents are specialized and that they cooperate in order to be more innovative (Porter, 1998; 2000; Saxenian, 1994). Innovations can take various forms, without following any pre-determined sequence (Gallouj and Weinstein, 1997).

Finally with regards to the third characteristics, it can be underlined that within a cluster, every agent can anticipate/forecast new technological or market opportunities, although their anticipation is imperfect because of bounded rationality (Frenken, 2006; Desmarchelier et al., 2013b). This characteristic is important, because it contradicts the very conception of a from birth to death pre-determined cluster cycle. In addition, unlike Menzel and Fornahl (2010), who introduce exogenous factors as the main drivers likely to change the course of a system, in a CAS approach, clusters adapt because of their agents' individual anticipations.

In conclusion, and as we will try to confirm it in the empirical part of this work, these characteristics seem to fit well with what is known about clusters functioning. Then, how does the conception of clusters as CAS change the way we understand their dynamics?

Our literature review identified the very reason of clusters' existence: the knowledge-seeking behavior of the firms. They seek knowledge from other firms or from other

types of agents – notably KIBS, including universities. But we also identified an important difference between Life Cycle theory and network-based theory, regarding the way they address the knowledge dynamics within clusters: the life cycle theory postulates a knowledge homogenization process, whereas the network-based approach postulates a specialization process. The first CAS property (i.e. no global optimum) fits well with the idea of specialized agents, but the “anticipation” and “innovation” properties are not imposing any type of pre-determined process. Agents are heterogeneous, and KIBS may allow for both homogenization and specialization trajectories, admitting that a general/cluster-level trajectory can be found. The two other CAS properties (i.e. innovation and anticipation) indicate that the alternative routes in Menzel and Fornahl (2011) (i.e. adaptation, renewal and transformation) are the rule rather than the exception in CAS dynamics. It follows that a proper deterministic life cycle is likely to be the reflect of a degenerative cluster (ex. Route 128 in Saxenian, 1994).

Clusters have already been modelled as CAS thanks to agent-based modelling⁶ (Dilaver et al., 2014; Boero et al., 2004; Squazzoni and Boero, 2002; Albino et al., 2003). Important question to tackle within this perspective are how specialized agents tie to each other and then how these ties evolve. In this respect, Boero et al. (2004) propose various matching strategies. As an example – for a specific agent – the strategy could be: *“look at the first agent with different technology/techno-organizational asset you meet”* (p. 12). These theoretical efforts are welcome, but the building of relevant models has to rely on a set of well-established stylized facts (Borrill and Tesfatsion, 2011). Discussing about clusters’ dynamics and their main drivers supposes to decide in a first step which aggregate indicators/variables (number of actors, quantity produced, number of patents, R&D expenditures, etc.) and which underlying networks to consider. Unfortunately, to our knowledge, there is still no such empirical study within a CAS framework. Indeed, although theoretically appealing, the CAS approach remains hard to put into practice. We thus propose, in the remaining of the paper, a strategy for operationalizing the CAS framework.

2. Clusters as CAS: empirical example and insights about clusters dynamics

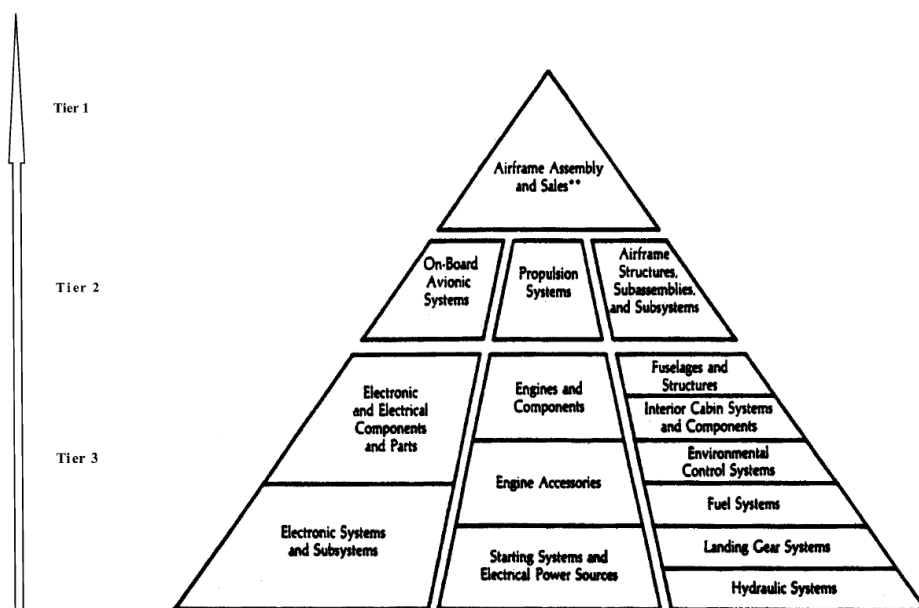
In order to conduct an empirical investigation, we have to make several choices: (a) which industry to study? (b) Which cluster to focus on within this industry? (c) What kind of networks are we looking at? After making our choices, we explore the dynamics of the selected empirical network of agents and we draw general conclusions about clusters dynamics.

⁶ Applied to economics, agent-based modelling is “a computational approach that aims to explain economic systems by modeling them as societies of intelligent software agents. The individual agents make autonomous decisions, but their actual behaviors are constrained by available resources, other individuals’ behaviors, and institutions” (Osinga et al., 2011).

a. Which industry to study?

The “*non-universal competitor*” principle (Holland, 2012) advocates for the study of sectors with complex technology landscapes⁷, because they are the most likely to offer many niches and thus many opportunities for clusters to emerge. According to Arthur (2009), all products display a tree-like recursiveness: “*the technology is the trunk, the main assemblies the main branches, their subassemblies the sub-branches, and so on, with the elemental parts the furthest twigs ... The depth of this hierarchy is the number of branches from trunk to some representative twigs*” (p. 38). The more complex a product is, the more it relies on a complex technology – i.e. a technology with a high depth. Arthur (2009), among others (Frenken, 2006; Niosi and Zhegu, 2005), argues that the aircraft industry relies on very complex technologies, composed of many subparts.

The resulting hierarchy between producers of various airplanes’ subparts is represented in Figure 3, from Niosi and Zhegu (2005). Following the CAS approach, clusters can be found in any layer of this hierarchy. The biggest clusters include agents involved in top layers, and more particularly the “prime contractors” or “airframe assemblers”: Bombardier in Montréal, Airbus in Toulouse, Boeing in Seattle (Niosi and Zhegu, 2005) or Lockheed Martin in Los Angeles (Scott, 1990).



⁷ Kauffman et al (2000) define a technology landscape as a set of values attributed to all the various possible “production recipes” (p. 8), which are represented as vertices of a “directed graph”. A production recipe “encompasses all the deliberate organizational and technical practices which, when performed together, result in the production of a specific good” (p. 4).

Technology landscape is a metaphor originated from biology (Kauffman, 1993) for representing the choice of economic agents when they have to decide what to produce and how to produce it. It states that agents’ initial choice has long term incidence on their adaptability since it constraints their innovation capabilities, this is the reason why production recipes are embedded into a directed graph: it is not possible to switch easily from a recipe to another.

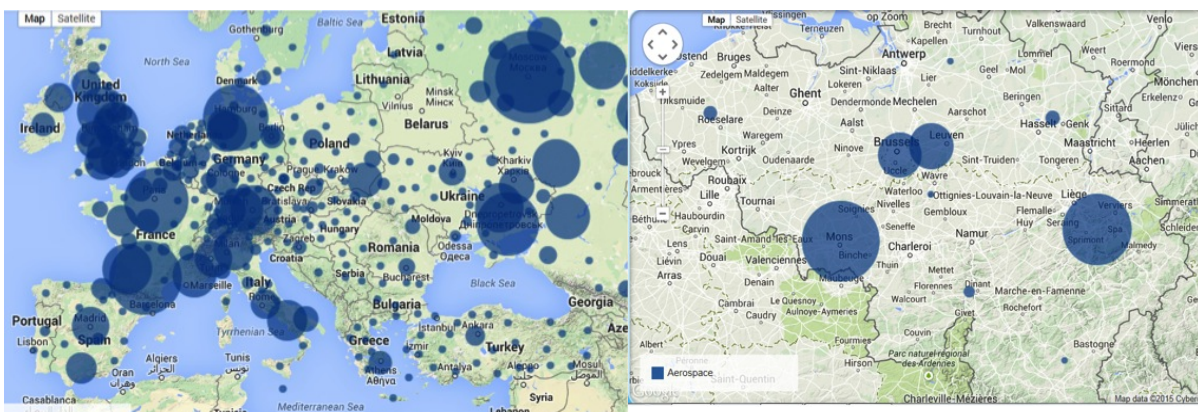
Figure 3: Aircraft producers' pyramid (from Niosi and Zhegu, 2005 p.8)

b. Which cluster to study?

For every sector, it is common to find contributions focusing on successful/first class clusters: Route 128, Silicon Valley, Detroit, Los Angeles (Saxenian, 1994; Klepper, 2010; Scott, 1990). The most important ones for the aircraft industry have already been mentioned (Montréal, Toulouse, Seattle, Los Angeles) and won't be considered for the present study. Indeed, we rather choose to focus on a niche cluster, for highlighting the difference between the CAS and the more traditional/aggregate (or life cycle) approach of the clustering phenomenon.

In the traditional approach, authors generally study the geographical concentration of employment or companies by industry (Shin and Hassink, 2011; Niosi and Zhegu, 2005; Scott, 1990), or the geographical concentration of production (Shin and Hassink, 2011) or of the innovation activity (Audretsch and Feldman, 1996a; 1996b) for a given industry. Interestingly, there are very few accounts of the actual linkages between these actors, although Saxenian (1994) reported – with the example of the Route 128 – that spatial proximity does not necessarily imply strong cooperation. One can also highlight a very limited account for actors' diversity within this aggregate approach, since only “firms” are generally mentioned.

Figure 4 (left) displays the most recent account for the number of employees in aerospace industry within all European regions. We observe that aerospace employment is widespread, although quite concentrated in Western Europe and Russia. This dispersion is higher than what is observed in the United States and is generally explained by political reasons, notably the need to ensure countries independence (Niosi and Zhegu, 2005). In an aggregate view, we would consider studying the Southwest of France, Northern Germany or South England. However as far as we favor the CAS approach, we rather choose a small cluster. Figure 4 (right) displays a map of Belgium and the regional concentration of employment in aerospace. We distinguish two relatively major poles within the southern regions - surrounding the cities of Mons and Liège – and two smaller poles near Brussels and Leuven. In 2006, all the actors from these 4 poles joined to create an official association called Skywin.⁸ We propose to study this cluster.



⁸ <http://www.skywin.be/?q=en> (last access: 10 Feb. 2015)

Figure 4: Number of employees in the aerospace industry in Europe (left) and in Belgium (right) in 2011⁹

c. What kind of networks are we looking at?

As we have already pointed out, a CAS is primarily a network of heterogeneous and specialized agents, which can be described in the following terms: (i) it emerges within (technological or market) niches, (ii) it is strongly oriented towards innovation and (iii) it is quick to adapt to changes in its environment thanks to its agents' anticipations and innovations (Holland, 2012). Skywin is presented as *"a group of companies, training centers and research units engaged in public and private partnership and building synergies around common and innovative projects"*.¹⁰ These projects fit into six main axes that the agents anticipate to be of strategic importance for their future development¹¹:

1. Composite materials and processes
2. Metallic materials and processes
3. Embedded systems
4. Airport services
5. Space applications and systems
6. Modelling and simulation

These six themes reflect the niche position of Skywin within the aircraft producers' pyramid (Figure 3), as they mainly fit into some of the third tier activities: fuselage and structure for the first two axes and the electronic systems for the third axe. Interestingly, the fourth one - airport services - is not part of the aircraft production process and it responds to a potential market in developing countries.¹² This exemplifies clusters ability to re-orient their activity through time. The sixth axe – "modeling and simulation" – arguably applies in every parts of the pyramid (Figure 3) since simulation is generally involved in the conception phase of any airplane components. Finally, the fifth axe on "space applications and systems" reveals a specialization relevant for the space industry (not considered in the present work).

Skywin is thus a group of heterogeneous agents, and the main interactions we should look at are those taking place within these "common and innovative projects". An exhaustive list is provided by the cluster website¹³, which covers 46 common projects undertaken collectively between 2006 and 2014. The following informations are provided for every project: the agents involved - classified into two categories

⁹ www.clusterobservatory.eu (last access: 10 Feb. 2015, the numbers are for 2011)

¹⁰ http://www.skywin.be/?q=en/mission_and_strategy (last access: 10 Feb. 2015)

¹¹ http://www.skywin.be/?q=en/mission_and_strategy (last access: 10 Feb. 2015)

¹² As an example, it has been reported that 25.2% of flights in Mainland China have been delayed in 2012, 14.9% of them for an "unidentified reason".

Beijing News, 23 May 2013:

http://www.bjd.com.cn/10beijingnews/201305/23/t20130523_3774403.html

¹³ [http://www.skywin.be/sites/default/files/kcfinder/1-](http://www.skywin.be/sites/default/files/kcfinder/1-vincent.marchal%40skywin.be/files/Fiches%20projets%20Skywin%20Calls%201-9.pdf)

[vincent.marchal%40skywin.be/files/Fiches%20projets%20Skywin%20Calls%201-9.pdf](http://www.skywin.be/sites/default/files/kcfinder/1-vincent.marchal%40skywin.be/files/Fiches%20projets%20Skywin%20Calls%201-9.pdf) (last access: 10 Feb. 2015)

(“industries” and “research bodies”¹⁴) – as well as the total budget (in millions of Euros) and the duration of the project (start and end years).

These informations allow for the building of a bi-partite relational database linking two sets of nodes (cf. the definition of a network): the agents and the projects in which they are involved. This database makes it possible to draw Figure 5. In this figure, red ellipses represent the projects and the blue ones represent the agents, whether they are “industries” or “research bodies”. Links represent somehow the involvement within a project or more exactly the level of expected involvement, as it may be expressed by the budget allocated to the project¹⁵. The thicker and darker they are, the higher the project’s financial value (and the expected involvement) is. This Figure does not distinguish between time periods: it summarizes all the interactions that took part within Skywin from 2006 to 2014.

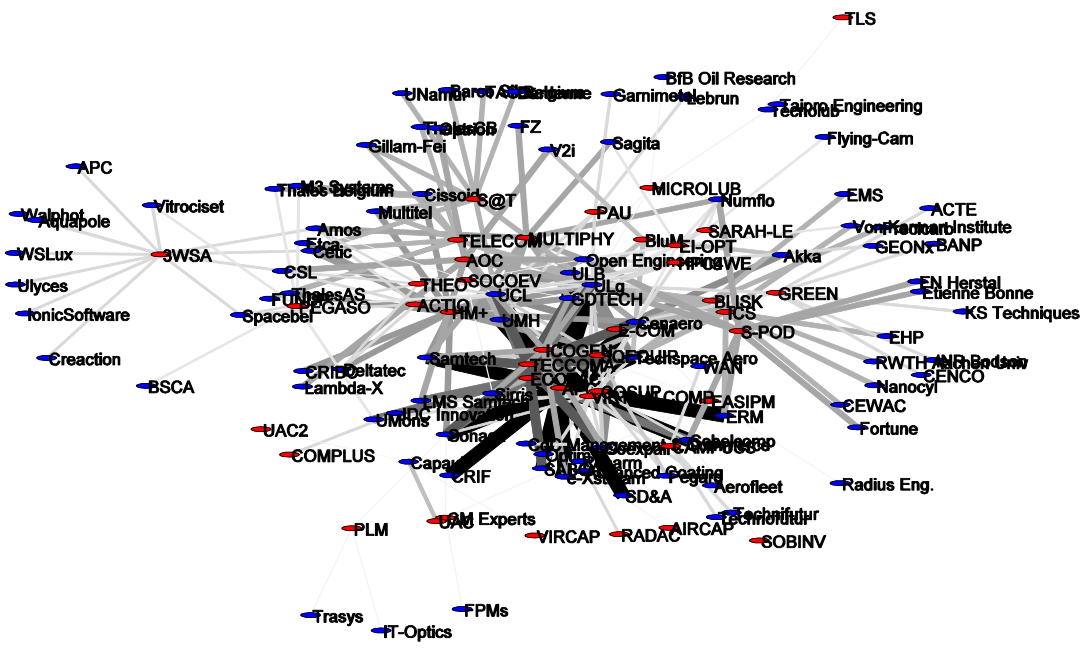


Figure 5: Skywin bi-partite innovation network (blue vertices = Agents; red vertices = projects)

d. Studying clusters dynamics through innovation networks

In Figure 5, the agents are not directly linked, that’s why we modify the network on the basis of the hypothesis that agents who are participating to the same project are in fact directly linked. We also consider the time dimension and obtain as a result the 9 configurations of the network for each year from 2006 to 2014 displayed in Annex 1. Table 1 summarizes some descriptive statistics of these configurations.

¹⁴ These “research bodies” include universities, training centers and private research institutions. We thus assimilate them to KIBS.

¹⁵ It should be noted that as far as there is no information on how the budget is allocated between the different partners of a given project, the whole budget is associated with each of them.

	Number of Actors	Av. Degree ¹⁶	Density (No Loops allowed) ¹⁷	Av. Path Length ¹⁸ among reachable pairs
2006	15	7.33	0.52	1.00000
2007	44	13.54	0.31	1.72740
2008	52	13.57	0.26	1.88690
2009	61	14.46	0.24	1.90169
2010	67	14.68	0.22	1.90629
2011	61	13.97	0.23	1.84570
2012	62	13.45	0.22	1.76497
2013	60	10.53	0.18	1.82214
2014	56	9.53	0.17	1.79285

Table 1: Properties of Skywin temporal networks

In a traditional – aggregate – perspective, authors focus on the number of actors within a given geographical area. In table 1, we rather report the actors who actively cooperate on a set of common projects. Looking at first at the number of these actors – and abstracting from the European economic crisis during the period - we may consider that Skywin enters into a phase of decline starting from 2010. This general movement goes hand in hand with a decrease in the average degree and networks' densities, which means that the agents who take part to innovation projects are more and more loosely connected. In other words, the cluster loses its attractiveness for potential newcomers: knowledge-seeking agents cannot find enough useful knowledge for exploring their technological or market landscapes, or simply the niches within which Skywin is evolving are not promising enough. Overall, these evolutions are consistent with the life-cycle theory.

However, several elements contradict this pessimistic and deterministic conclusion. (i) The configurations of the network displayed in Annex 1 are particularly dynamic throughout the considered time span. From year to year actors are leaving and others are entering into the network, following projects life cycles. Active actors are thus changing: looking at the network's configurations, we count in total 92 different active agents from 2006 to 2014, although no more than 67 were operating at the same time. This suggests a positive rate of turnover among these agents. (ii) There remain plenty of opportunities for partnerships, as innovation networks' densities always evolve within a range comprised between 17 % and 31 %.¹⁹ In this respect,

¹⁶ The average degree of a network gives the average number of links per agent within the network. For instance, the agents taking part to innovation projects in 2008 were, on average, linked to 13.57 agents.

¹⁷ Network density is the ratio between the actual number of links and the maximum possible in a hypothetical situation where each agent is connected to all the others. For instance, a density equal to 0.52 means that 52 % of the connection possibilities are exploited by the agents.

¹⁸ The path length between two agents i and j is the shortest distance between them (i.e. the shortest sequence of vertices). The average path length of a network is obtained by averaging all the path length between all the reachable agents of this network. Isolated agents are thus not taken into account.

¹⁹ We omit the density of the network configuration in 2006 (date of the creation of the cluster) because its relatively high value is explained by the fact that the cluster included only one project with several actors..

Skywin accounts for a total of 117 members.²⁰ Considering the 92 active agents, this highlights both a high rate of cooperation between Skywin members and the existence of unused opportunities. (iii) The path length values in table 1 are always much smaller than the number of agents within the network. This reveals the presence of a small-world effect (Newman, 2003): because of a high rate of overlap between the members of different projects, it becomes easy for any agent – even for a newcomer – to obtain information or knowledge coming from other projects. These short path lengths can thus be considered as a good proxy for evaluating the advantages of taking part in this cluster. Considering the relative stability of this measure in Table 1, we cannot sustain the declining hypothesis that results from the sole observation of the number of active agents.

We argue that, in a knowledge-seeking perspective, agents benefit from the existence of a small-world effect, which itself emerges from a certain degree of overlap between the various projects. It follows that the core agents of a given cluster are those who allow for overlaps to occur. A good way to identify them is to compute agents' degree centralities, i.e. for a given agent i , to count the number of links he/she has with the other agents in the network. We can also take into account the fact that different links are not equivalent, in the sense that – at least for our current networks – the financial values of the various projects are different. In order to take these links' values into account, we compute the weighted degree of centrality measure proposed by Opsahl et al. (2010).

Be $\alpha \in [0; 1]$ a tuning parameter, k_i the number of links connected to the agent i and s_i the average weight (or value) of these links, then $C_D^{W\alpha}(i)$, the weighted degree centrality of the agent i is given by the following equation:

$$C_D^{W\alpha}(i) = k_i^{1-\alpha} \times s_i^\alpha$$

The more α is important, the more we attribute importance to links' values in computing agents' centralities. Top 10 weighted degree centralities for every year and for various α values are reported in Annex 2. We observe that, in virtually all cases, the two most central actors belong to the “research bodies” category. The University of Liège and the Catholic University of Leuven are particularly central. Industrial firms are also well represented in these rankings and, even though we observe the recurrence of national leaders in the aerospace industry (e.g. Sonaca), they are much more “volatile” than universities in the sense that their relative positions are less stable and that there is a much higher rate of turnover among firms within the top 10.

These results give interesting insights about the drivers of clusters' attractiveness – measured in our case by a small-world effect within clusters' innovation networks. We show that this attractiveness relies on the presence of a stable core of highly

²⁰ <http://www.skywin.be/?q=en/members>

connected knowledge intensive business services (universities or research bodies in general). Arguably, what determines if a cluster is declining is not the age of the cluster as a whole, nor the number of the (active) agents it includes, but the quality and connectivity of the knowledge intensive business services in its core part. When looking at the number of innovation-active agents, we could say that Skywin is entering into a phase of decline, but a closer look to its innovation networks' properties reveals an attractive cluster and thus show potential for new phases of growth.

Conclusion

Clusters' dynamics are generally understood as the evolution of an aggregate indicator, like the number of firms operating in a given geographical area. Two competing theories aim at explaining the dynamics of this indicator: the life cycle theory and the network-based approach. Both consider knowledge processing as the main driver but in an opposite way. For the tenants of the life cycle, clusters evolve through a process of knowledge homogenization among their members, whereas the network-based approach considers that knowledge becomes more and more specialized. We argue that KIBS play a major role in both of these directions, and we thus advocate for an alternative/ synthesizing approach.

Such synthesis should combine the aggregate point of view of the life cycle theory with the actor-centered network-based approach, while avoiding their deterministic predictions. Complex adaptive systems are a promising candidate for such a purpose. In order to consider their implications for clusters' dynamics, we conducted within this framework an empirical analysis on a given industrial cluster (the aeronautics cluster in Belgium).

We discovered that this cluster's innovation networks exhibit a small-world effect. This implies that any agent who takes part into an innovation project of this cluster can easily benefit from knowledge and information generated in another ongoing project. We argue that this effect is an interesting proxy of a cluster's attractiveness and an appropriate aggregate variable for studying clusters' dynamics as it shows cluster's potential for further growth. We also demonstrate that KIBS are the main responsible for the emergence of this small-world effect in innovation networks.

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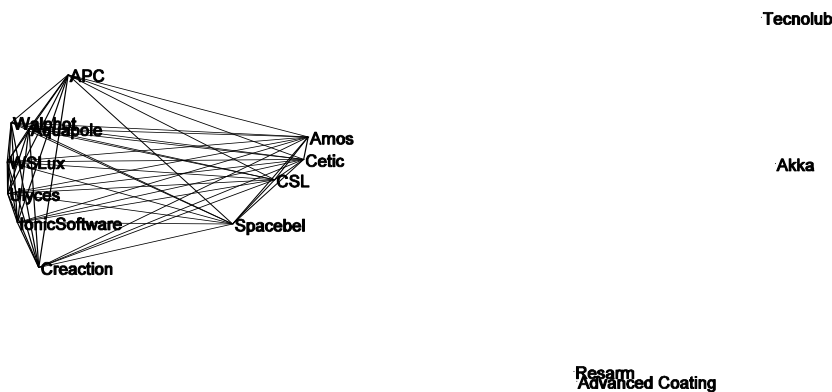
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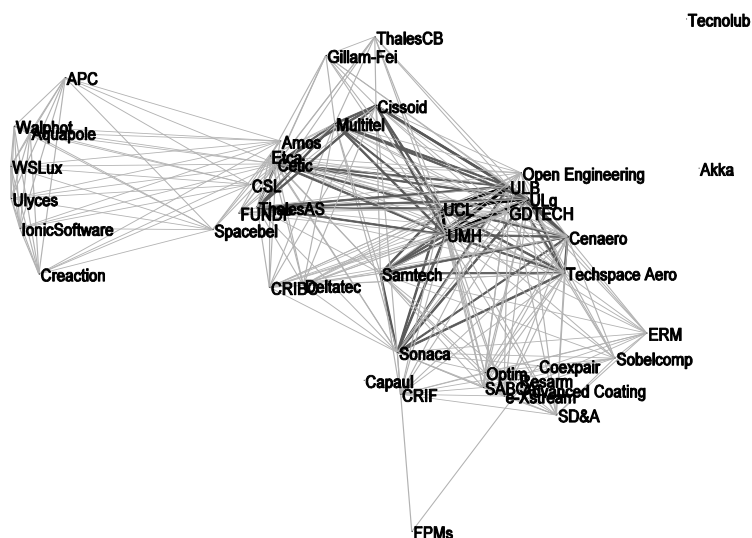
Annex 1: Skywin's innovation networks from 2006 to 2014

These networks have been obtained by formulating the hypothesis that agents' participating to the same project are linked together. All nodes thus represent firms or research centers. Isolated agents are those who are taking part in projects in which they are the only actor involved. In a given graph, darker and thicker links represent partnerships in projects with relatively higher financial values.

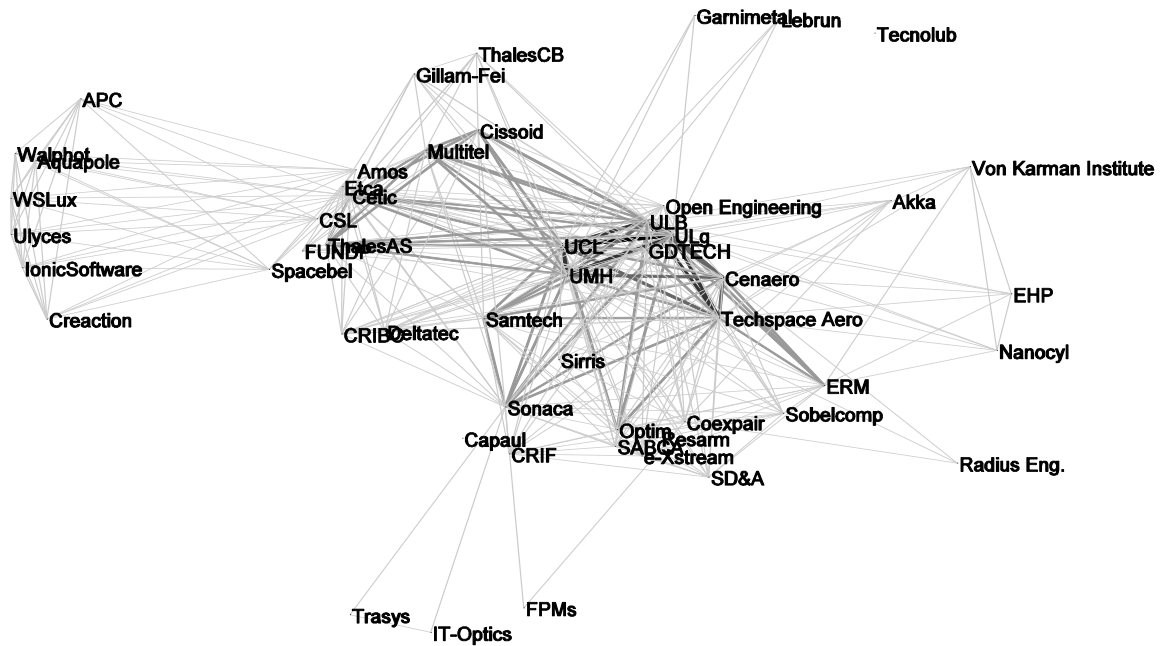
i. Figure 6 : 2006



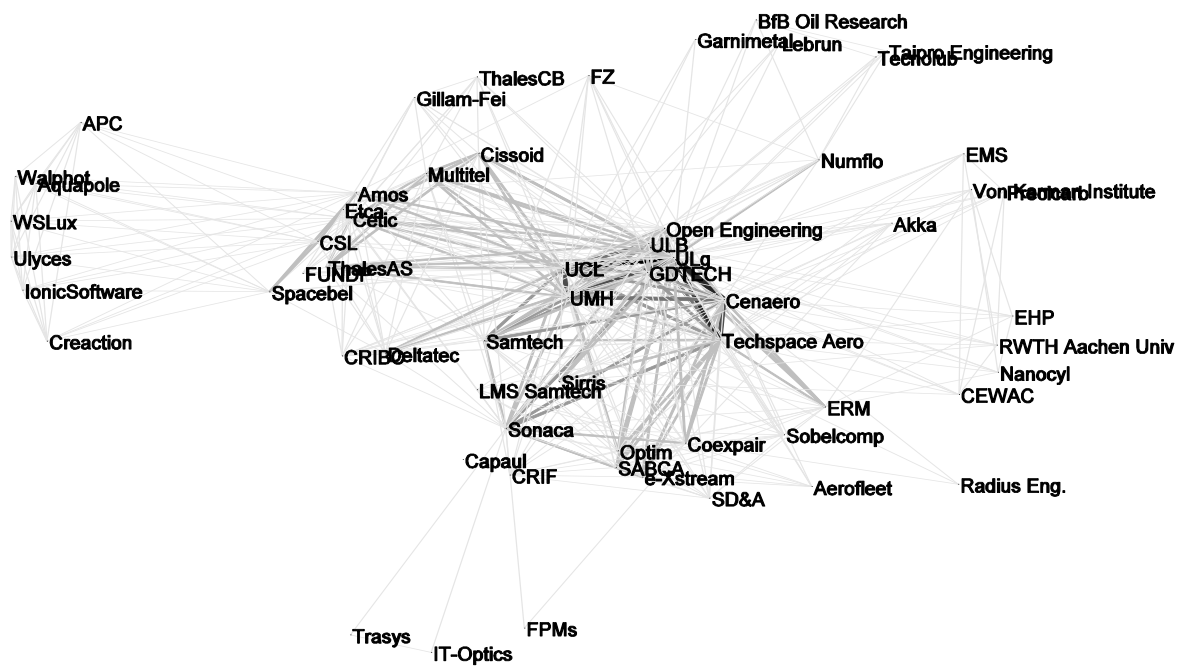
ii. Figure 7: 2007



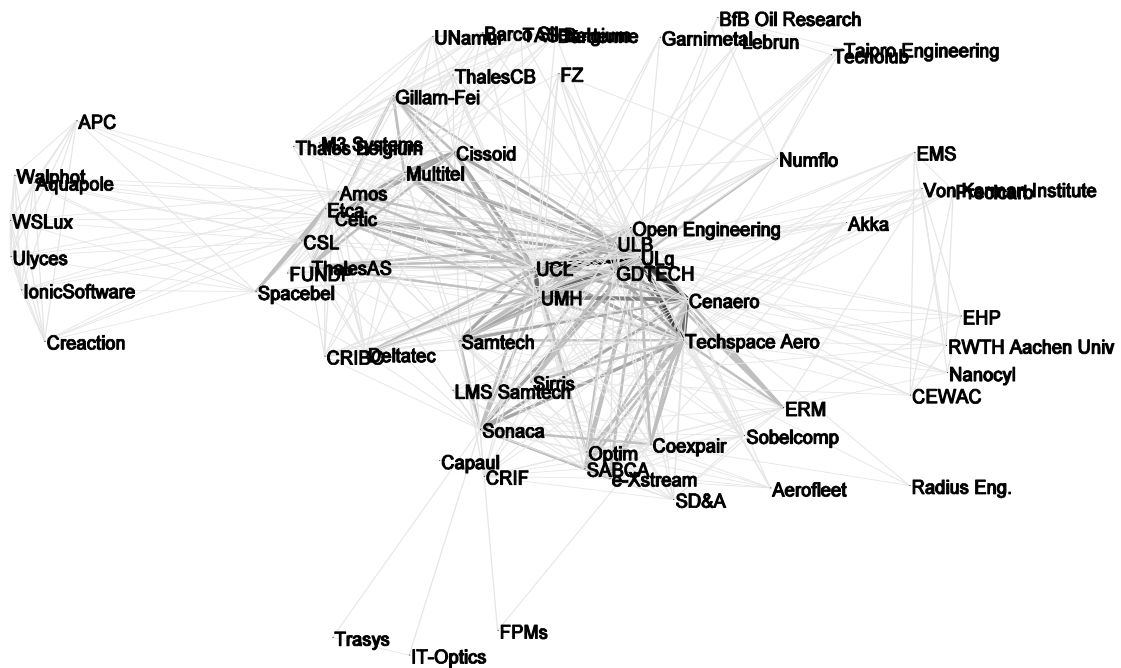
iii. Figure 8: 2008



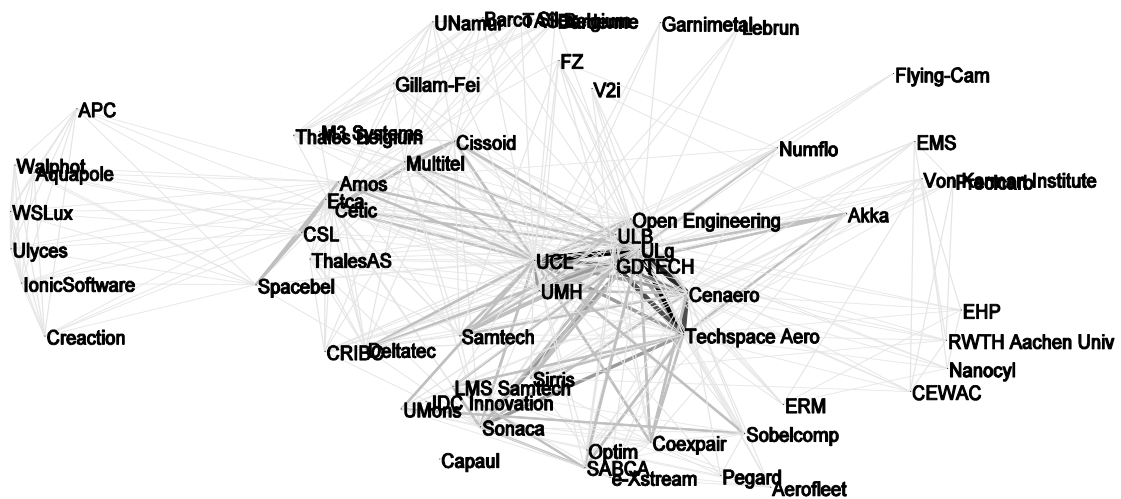
iv. Figure 9: 2009



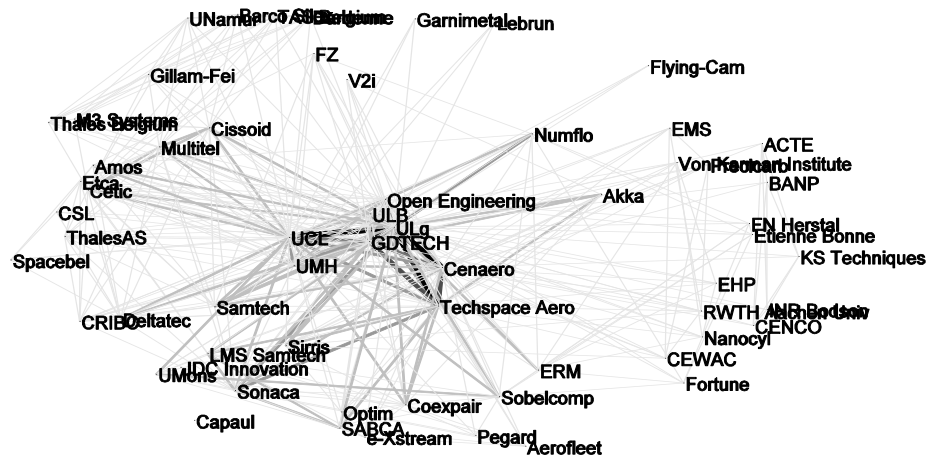
v. Figure 10: 2010



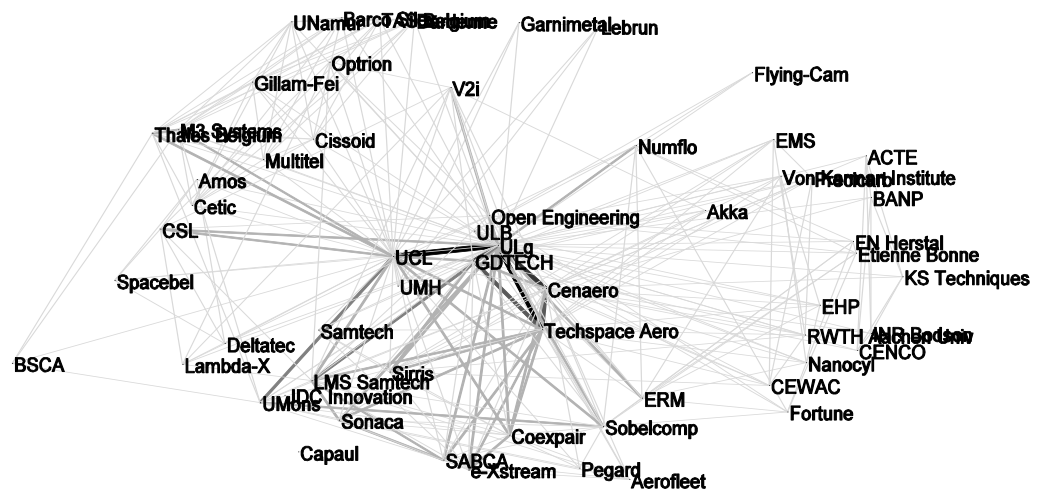
vi. Figure 11: 2011



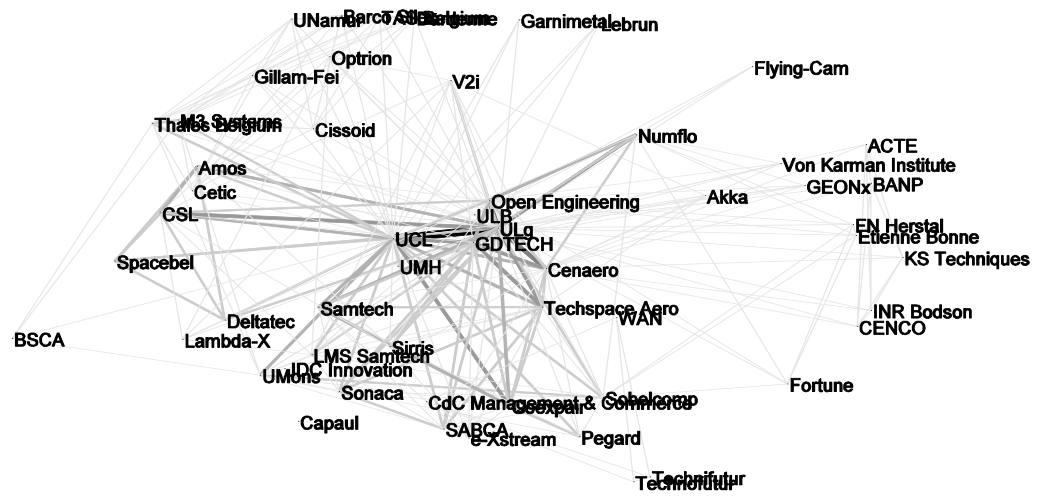
vii. Figure 12: 2012



viii. Figure 13: 2013



ix. Figure 14: 2014



Annex 2: Top 10 weighted degree centralities per year

2006			2007			2008			2009			2010			2011			2012		
Agents	Type	Cwd(i)	Agents	Type	Cwd(i)	Agents	Type	Cwd(i)	Agents	Type	Cwd(i)	Agents	Type	Cwd(i)	Agents	Type	Cwd(i)	Agents	Type	Cwd(i)
Aquapole	Research	6.80948	CetIndustry	Research	15.4418	ULG	Research	18.7524	ULG	Research	25.3146	ULG	Research	27.7763	ULG	Research	25.8309	ULG	Research	
CSL	Research	6.80948	UCL	Research	14.7705	ULB	Research	17.8305	Cenaero	Research	20.4387	UCL	Research	22.4516	UCL	Research	20.8232	Cenaero	Research	
Spacebel	Industry	6.30957	ULB	Research	14.7705	UCL	Research	17.2989	UCL	Research	19.8468	Cenaero	Research	20.4387	Cenaero	Research	20.3615	UCL	Research	
CetIndustry	Research	6.30957	ULG	Research	14.7705	UMH	Research	17.0241	ULB	Research	19.4721	ULB	Research	19.4721	Techspace A	Industry	19.1457	Techspace A	Industry	
CreacIndus	Industry	6.30957	UMH	Research	14.7705	Techspace A	Industry	16.1466	Techspace A	Industry	19.2091	Techspace A	Industry	19.2091	GDTECH	Industry	17.7651	GDTECH	Industry	
Ulyces	Industry	6.30957	Sonaca	Industry	14.213	Cenaero	Research	15.4421	UMH	Research	18.2283	CetIndustry	Research	18.2331	CetIndustry	Research	16.7783	ULB	Research	
Amos	Industry	6.30957	Techspace A	Industry	12.9557	CetIndustry	Research	15.4418	Sonaca	Industry	15.9253	UMH	Research	18.2283	ULB	Research	14.2981	Open Engin	Industry	
Walphot	Industry	6.30957	Samtech	Industry	12.9557	Sonaca	Industry	14.6256	CetIndustry	Research	15.4418	Sonaca	Industry	15.9253	Sonaca	Industry	13.124	Sonaca	Industry	
Industryonlin	Industry	6.30957	Cenaero	Research	12.9557	Samtech	Industry	12.9557	GDTECH	Industry	15.1836	GDTECH	Industry	15.1836	Cindustrys	Industry	12.6856	CetIndustry	Research	
WSLux	Industry	6.30957	ThalesAS	Industry	11.2266	GDTECH	Industry	11.3936	Samtech	Industry	14.6959	Samtech	Industry	14.6959	MultIndustr	Research	12.6856	Cindustrys	Industry	
APC	Research	6.30957	Cindustrys	Industry	11.2266	ThalesAS	Industry	11.2266	Amos	Industry	11.3936	Cindustrys	Industry	14.2038	UMH	Research	12.1846	MultIndustr	Research	

Table 1: Weighted Degree Centralities ($\alpha=0.2$)

2006			2007			2008			2009			2010			2011			2012		
Agents	Type	Cwd(i)	Agents	Type	Cwd(i)	Agents	Type	Cwd(i)	Agents	Type	Cwd(i)	Agents	Type	Cwd(i)	Agents	Type	Cwd(i)	Agents	Type	Cwd(i)
Aquapole	Research	3.31662	UCL	Research	6.32456	ULG	Research	7.68115	ULG	Research	9.69536	ULG	Research	10.247	ULG	Research	9.59166	ULG	Research	
CSL	Research	3.31662	ULB	Research	6.32456	ULB	Research	7.4162	UCL	Research	8.12404	UCL	Research	8.77496	UCL	Research	8.12404	UCL	Research	
Spacebel	Industry	3.16228	ULG	Research	6.32456	UCL	Research	7.2111	Cenaero	Research	8.06226	Cenaero	Research	8.06226	Techspace A	Industry	7.74597	Cenaero	Research	
CetIndustry	Research	3.16228	UMH	Research	6.32456	UMH	Research	6.9282	Techspace A	Industry	7.81025	Techspace A	Industry	7.81025	Cenaero	Research	7.68115	Techspace A	Industry	
CreacIndus	Industry	3.16228	CetIndustry	Research	6	Techspace A	Industry	6.7082	ULB	Research	7.74597	ULB	Research	7.74597	GDTECH	Industry	7.34847	GDTECH	Industry	
Ulyces	Industry	3.16228	Sonaca	Industry	5.74456	Cenaero	Research	6.32456	UMH	Research	7.48331	UMH	Research	7.48331	CetIndustry	Research	6.08276	ULB	Research	
Amos	Industry	3.16228	Techspace A	Industry	5.47723	CetIndustry	Research	6	Sonaca	Industry	6.48074	CetIndustry	Research	6.85565	ULB	Research	5.83095	Sonaca	Industry	
Walphot	Industry	3.16228	Samtech	Industry	5.47723	Sonaca	Industry	5.83095	GDTECH	Industry	6.40312	Sonaca	Industry	6.48074	Sonaca	Industry	5.65685	Open Engin	Industry	
Industryonlin	Industry	3.16228	Cenaero	Research	5.47723	Samtech	Industry	5.47723	Samtech	Industry	6.245	GDTECH	Industry	6.40312	UMH	Research	5.38516	UMH	Research	
WSLux	Industry	3.16228	ThalesAS	Industry	5.09902	ThalesAS	Industry	5.09902	CetIndustry	Research	6	Samtech	Industry	6.245	Cindustrys	Industry	5.19615	CetIndustry	Research	
APC	Research	3.16228	Cindustrys	Industry	5.09902	Cindustrys	Industry	5.09902	ThalesAS	Industry	5.09902	Cindustrys	Industry	6.08276	MultIndustr	Research	5.19615	Cindustrys	Industry	

Table 2: Weighted Degree Centralities ($\alpha=0.5$)

2006			2007			2008			2009			2010			2011			2012		
Agents	Type	Cwd(i)	Agents	Type	Cwd(i)	Agents	Type	Cwd(i)	Agents	Type	Cwd(i)	Agents	Type	Cwd(i)	Agents	Type	Cwd(i)	Agents	Type	Cwd(i)
Aquapole	Research	1.61539	UCL	Research	2.7081	ULG	Research	3.14626	ULG	Research	3.71328	ULG	Research	3.7802	ULG	Research	3.56163	ULG	Research	
CSL	Research	1.61539	ULB	Research	2.7081	ULB	Research	3.08461	UCL	Research	3.32547	UCL	Research	3.4296	UCL	Research	3.16954	UCL	Research	
Spacebel	Industry	1.58489	ULG	Research	2.7081	UCL	Research	3.00598	Cenaero	Research	3.18024	Cenaero	Research	3.18024	Techspace A	Industry	3.13386	Techspace A	Industry	
CetIndustry	Research	1.58489	UMH	Research	2.7081	UMH	Research	2.81953	Techspace A	Industry	3.17558	Techspace A	Industry	3.17558	GDTECH	Industry	3.09966	GDTECH	Industry	
CreacIndus	Industry	1.58489	CetIndustry	Research	2.33133	Techspace A	Industry	2.78696	ULB	Research	3.08134	ULB	Research	3.08134	Cenaero	Research	2.89763	Cenaero	Research	
Ulyces	Industry	1.58489	Sonaca	Industry	2.32181	Cenaero	Research	2.59032	UMH	Research	3.07215	UMH	Research	3.07215	Sonaca	Industry	2.43828	Sonaca	Industry	
Amos	Industry	1.58489	ThalesAS	Industry	2.31594	CetIndustry	Research	2.33133	GDTECH	Industry	2.70028	GDTECH	Industry	2.70028	UMH	Research	2.38005	UMH	Research	
Walphot	Industry	1.58489	Cindustrys	Industry	2.31594	Sonaca	Industry	2.32469	Samtech	Industry	2.6538	Samtech	Industry	2.6538	ULB	Research	2.37793	ULB	Research	
Industryonlin	Industry	1.58489	MultIndustr	Research	2.31594	ThalesAS	Industry	2.31594	Sonaca	Industry	2.63731	Sonaca	Industry	2.63731	Samtech	Industry	2.2444	Open Engin	Industry	
WSLux	Industry	1.58489	Techspace A	Industry	2.31558	Cindustrys	Industry	2.31594	CetIndustry	Research	2.33133	Cindustrys	Industry	2.60494	Open Engin	Industry	2.2444	Samtech	Industry	
APC	Research	1.58489	Samtech	Industry	2.31558	MultIndustr	Research	2.31594	ThalesAS	Industry	2.31594	MultIndustr	Research	2.60494	CetIndustry	Research	2.20523	CetIndustry	Research	

Table 3: Weighted Degree Centralities ($\alpha=0.8$)

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Serving mobile workers at university campuses – access to success

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University campus management organizations are challenged by digitalization, decreasing public funding, and low utilization rates of physical premises. In the network of increasingly complex service offerings, taking underutilized operand resources into more efficient uses is a strategy applied by novel service providers such as Hoffice, Uber and LiquidSpace. Hence, this paper explores such services as potential solutions for supporting mobile knowledge workers of university communities and beyond. As a result, a set of service clusters is drawn to help academics and practitioners understand services on offer and their potential implications for the university campus management organisations.

Keywords: Service management, Service logic, Utilization, Access, University campus management

1. Introduction

University campuses are focal attractors of global talents and hubs for knowledge creation and exchange. They are globally competing (Barnett 2013, Drori 2013, Poon and Brownlow 2015), monetarily struggling (Van Damme 2012, OECD 2012, Maassen and Stensaker 2015, Kamarazaly et al. 2013), digitally challenged (Carr 2012) and extravagantly utilized (Den Heijer 2011, Den Heijer and Zovlas 2014, Harrison and Les Hutton 2014, Hietanen 2014, Neary et al 2010, University Herald 2013).

When observed through service-dominant logic (Vargo and Lusch 2004), campuses are operand resources that exist to enable exchange and creation of operand resources – education, research and societal impact. The main challenges do not seem to be in limited operand resources per se but rather in an extravagant use of vast operand resources. They are inefficiently used and accumulate costs rather than optimally support operand resource creation and exchange.

Service-dominant logic suggests that services rather than goods should be seen as fundamental basis for value creation (Vargo and Lusch 2004, 2008). The value is seen to be co-created only by interactions of social and economic actors - resource integrators (Vargo and Lusch 2008). Furthermore, the roles of the suppliers are increasingly shifting towards supporters of proposed values that are then created through interactions with the value users, meaning customers. Building on the service-dominant logic, Grönroos and Ravald (2011) argue for service logic suggesting that value is even increasingly controlled by the customers, demand-side resource integrators, in their own processes.

These changes among others widen the engineering and cost-driven approaches traditionally applied in the field of Facilities Management (FM). Coenen and Von Fel-

ten (2012) argue that FM today has to overcome management challenges that go beyond the engineering and cost-driven approach. They suggest a service management approach to be applied in the context of FM.

Therefore, this paper aims to identify potential services that utilize access to underutilized operand resources as a key strategy to support mobile workers of a university community and beyond as resource integrators of campus services. It does so by first pinpointing the research gap through a literature overview of university campuses in spatial transformation, and second, analysing business models of services which, through providing access, are designed to support mobile knowledge workers. The primary data is collected on the internet sites of the services.

The paper is structured as follows: First, it links service theories with literature of university campus utilization. Second, it analyses access-based services by exploring the internet sites of the services through the lenses of the business model canvas (Osterwalder et al 2010). Third, it presents the main findings, and finally, it discusses the implications and limitations, which are followed by concluding remarks.

2. Literature

The service-dominant logic (Vargo and Lusch 2008) suggests that resources can be divided to operand, referring to physical goods, and operant, referring to non-physical resources such as knowledge or skills. Vargo and Lusch (2008) define that all economic and social actors are resource integrators. Kleinaltenkamp et al. (2012) perceive resource integration as means through which resource integrators co-create value which is determined phenomenologically.

Based on the service logic (Grönroos and Ravald 2011), value creation is increasingly controlled by the customers as resource integrators. Hence, Hibbert et al (2012) suggest that customers must acquire the necessary skills and knowledge to be effective resource integrators as they engage in activities that facilitate or create value. This is why organizations have a role in supporting customer learning. Therefore, supplying organizations can be seen as facilitators and co-creators that engage themselves in the customers' processes (Ojasalo & Ojasalo 2015).

University campuses can be seen in very essence as operand resources that exist to facilitate operant resource exchange including knowledge, learning, research and societal impact. The resource integrators can be thus seen in the university campus context to include but not necessarily be limited to students, staff members, entrepreneurs, researchers and the public. Their working and learning activities are increasingly mobile and disseminated around city structures (Laing 2014, Lindsay 2014, Waber et al 2014).

The demand-side resource integrators are also offered multiple services and alternatives for executing their daily routines and tasks individually, and in collaboration with each other (Laing 2014, Digitalworkhub 2013, Lindsay 2014, Waber et al 2014). Consequently, organizations decreasingly dictate the location of workplace, and knowledge workers as space users are provided with more freedom and responsibility of choosing where, how and when to work from (Termaat et al. 2014, Brinko et al. 2014).

University campus utilization is affected by digitalization in forms of Massive Open Online Courses (MOOCs) and totally virtual universities (Carr 2012). At the same time, campuses are struggling monetarily (Van Damme 2012, OECD 2012, Maassen and Stensaker 2015, Kamarazaly et al. 2013) and have low utilization rates globally (Den Heijer 2011, Den Heijer and Zovlas 2014, Harrison and Les Hutton 2014, Hietanen 2014, Neary et al 2010, University Herald 2013). They used to be funded by large with public funds which in general have been decreasing steadily with the tuition fees increasing in the systems where tuition fees are applied (Levy 2013, Bernasconi 2013, Fincher and Shaw 2009, Marginson 2007, Den Heijer 2011, Van Damme 2012, Maassen and Stensaker 2015).

Hanmer (2015) counted that an average square meter of usable floor area in an Australian university costs 350\$ AUD annually. This implies that each student would pay on average 4000\$ per annum of the university facilities in the most appreciated Group of 8 (Go8) universities which is 1500\$ more than a student studying in more efficient Australian institutions. In Finland, during a major university reform in 2009, the government handed majority of the university facilities to companies owned mainly by the universities. A study suggested that there was 12-20% too much space in the university facilities – instead of accommodating a population of 5,3 million, there was enough space for needs of 8 million inhabitants (Sievänen 2014).

Multiple studies have indicated university facility utilization rates as low as 20-40% in the normal office hours (University Herald 2013, Hietanen 2014, Neary et al. 2010, Den Heijer and Zovlas 2014, Harrison and Les Hutton 2014). Due to the periodic nature of the educational and research activities, the usage is even lower between the lecturing periods. From facility lifecycle perspective, on the one hand, large investments are needed to maintain and renovate the buildings that are mainly built in the 1960s or the 1970s in Europe with outdated pedagogical designs and poor in technical condition (Den Heijer and Zovlas 2014). On the other hand, universities are eager to experiment with totally new solutions because the old facilities designs do not adapt to the new demands.

In practice, majority of universities are struggling with similar challenges. Large investments are made in spaces with low utilization rates, high lifecycle costs and maintenance fees which does not create value for the university core businesses – education, research and societal impact. Empty spaces rather accumulate costs that could be invested in the university core businesses. The largest challenges seem to lie in economical paucity and institutional sharing – how to get the best out of narrow resources and how to facilitate sharing of them in massive traditional organizations.

In addition to the obvious digitalization of education and research itself, there is an increasing amount of services that provide access to pools of virtual information and underutilized operand resources (Eckhardt and Bardhi, 2015) such as Airbnb, Hof-fice, Uber and Liquidspace. Their logic is ground breaking but rather simple - they connect the ones that own or have the right to use underutilized operand resources to the ones in need of them, and take a provision from each connected provider and demander. As it seems, that the role of university campus is increasingly to connect multiple stakeholders with one another, these sorts of services combined with location-based technologies might help in overcoming the challenges that university campus managers are facing.

3. Method

This study follows a single case study with embedded units methodology as described by Yin (2003). It constitutes part of a project that was set up to understand and develop services that are challenging – even replacing – traditional workplace. The case services were hand-picked and the evidence was let to emerge from the data through constant cross-case comparison.

The data collection was done in two phases: first, market level data collection aimed to create a holistic understanding of the service branches that support multi-locational work in the market, and second, the service level data collection aimed to identify differences between services in service branches through cross-case comparisons. The initial sample that was explored on the market level consisted of a hundred services that support multi-locational workers. For the second data collection phase, the sample was narrowed down to eight service examples. The selection was made based on four criteria - they: represent different service segments, link multiple traditional service segments, improve utilization of underutilized resources and have potential of supporting university communities.

The data in the first phase was collected on the internet sites of the services based on the Business Model Canvas (Osterwalder et al. 2010) tool. It is described as “a shared language for describing, visualizing, assessing and changing business models” (Osterwalder et al. 2010, 12) and designed to help entrepreneurs and managers in modelling the playground of their business and communicating it throughout the organization (Osterwalder 2012). It consists of nine building blocks: Value proposition, Customer segments, Channels, Customer relationships, Revenue Streams, Key Resources, Key Activities, Key Partnerships and Cost Structure.

The second phase data was also collected on the internet sites of the chosen service examples but deepened in terms of building blocks and narrowed down in terms of service numbers through applying the service logic business model canvas as suggested by Ojala and Ojala (2015). It differs from the business model canvas approach in that it highlights the role of a customer as a value creator by approaching each building block from both the customer and the service provider perspectives.

3.1. Analyses

Throughout the first data collection phase, the case services were analyzed within and across cases in three levels: *framework*, *pattern* and *component*. First, an initial *framework* emerged from identifying key elements of the canvas that differentiate the services from one another: Offering, Main User Segment, Revenue Streams, Resources, Cost Structure, Service providers.

Thereafter, emerging *patterns* were identified. Offering was identified to be space, community, technology or logistics –driven. Main User Segments were divided into three consumer personas: Molly the Mover, Felix the executor and Sally the socializer. Revenue streams consisted of eight patterns: membership, usage subscription, lease/rent, asset sale, free, licensing, ads and other. The resources were clustered into four patterns: Community presence, location, network and other. Cost structure was divided into two patterns: cost-driven and value-driven. And the service provid-

ers were categorized into seven according to their main businesses: Tech developers, Landlords, Community operators, Tech lords, Community developers, Community lords and Community lord developers.

The recently emerged services that support multi-locational work were noticed to have common characteristics in that they connect four major business fields of space, community, technology and logistics. The services can be seen as components that constitute a service offering that connect:

- 1) spaces and community, catering for people to meet face-to-face (MEET 'EM),
- 2) community and technology, catering for people to collaborate by means of technology (TECH 'EM),
- 3) technology and logistics, facilitating real time tracking of locations of objects, people and spaces (TRACK 'EM),
- 4) logistics and space, delivering objects, people and spaces from place to another (TRANSPORT 'EM).

After the analyses of the data collected in the first phase, for the purposes of this research and context of the university campuses, two examples of each service component was decided to be included in the second phase data collection and analyses. The services are exemplary and only serve to illuminate the case better. As the reviewed literature highlighted the increasing role of customer in value creation, we decided to deepen the analyses by taking the service logic business model canvas suggested by Ojala and Ojala (2015) as our tool to explore these services in more detail. The framework and the chosen cases under the service components are illustrated in Figure 1.

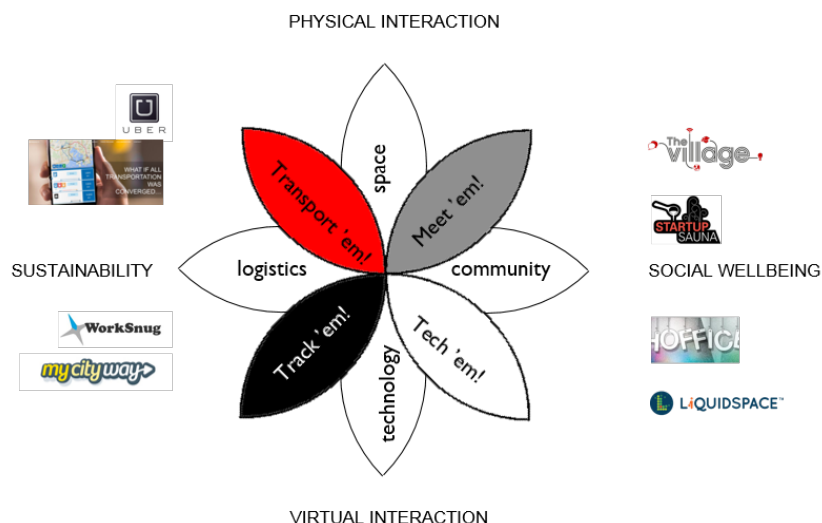


Figure 1 The framework and the chosen service examples

4. Results

The results indicate that all of the eight chosen services included in the final analyses function on a double-sided market where both the community of users and the community of service providers as demand-side resource integrators are equally important. As there are only eight services, we are not aiming for highly generalizable results but rather an illumination of types of services on offer.

In each analyzed service, the demand-side resource integrators, namely clients and users, play roles of Customers, Key resources and Key partners at the same time. Therefore, the argument of Grönroos and Ravald (2011) for service logic, where customers increasingly determine and control value creation, seems solid.

Each service utilizes a strategy of connecting operand resources in an attempt to create more value of operand resources through connecting demand-side resource integrators - service providers as clients and users as customers - together. However, four major clusters that base on different tactics related to operand resources were identified from service provider aspect: Inviting to, Facilitating sharing of, Providing access to; and Integrating use of a variety of accessible operand resources.

The major differentiators between the clusters are in the revenue logic and the offerings which indicates a similar trend as the arguments of Eckhardt and Bardhi (2015). The clusters are illustrated in Figure 2.

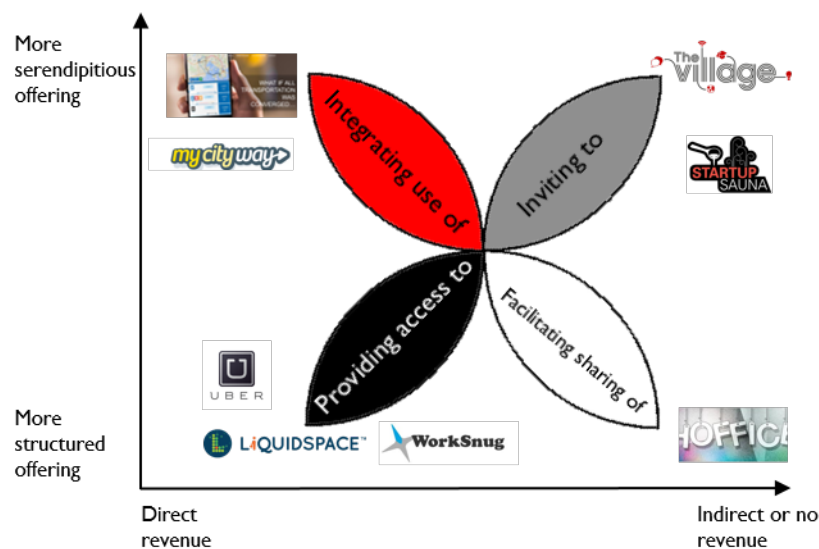


Figure 2 Identified service clusters

In *Providing access to* cluster, revenues are the most direct, and the offering is the most structured. The service provider as a client gets a certain part of the revenues per transaction gained from the user as a customer and the explored service offers a platform that facilitates the link between these two. The user as a customer is in control of the offering, knows what to look for and knows what to expect rather than looking for serendipitous encounters.

In *Integrating use of* cluster, the revenues are direct from the service providers as clients, the users as customers or both. The offering is more serendipitous and per-

sonalized, meaning that the user might get something even better than what expected resulting in loss of some control over the offering from the user perspective. The value is created by collecting personal data of users as customers, integrating offerings of clients as service providers, and facilitating the connections in between in real time.

In *Facilitating sharing of* cluster, no money is transferred. The offering from the user point of view is more structured than in the *Inviting to* cluster, as the community is more closed and personal - one can not just pop in when passing. The value is wholly created through facilitating individuals as peers who are sharing their own operand resources to exchange operand resources.

In the cluster of *Inviting to*, the service provider does not get direct revenue through the service it provides but uses the service provision as means of marketing, as an attractor or gains revenue indirectly through donations or funds. The offering is more serendipitous from the user point of view. The value is created to a large extent by the resource integrator community which exchanges operand resources in the physical premises and has the potential of attracting more similar-minded users.

5. Discussion

The role of university campuses seem to increasingly be facilitation of collaboration between people and organizations, and laboratory and forge works experiments, because majority of individual knowledge-intensive tasks can be done from a distance with a wifi connection. In general, the existing campuses are extravagantly utilized as each institution, faculty and industry firm tends to have a building and a specialized laboratory of their own.

5.1. Practical and research implications

Multiple services that aim to take operand resources in more efficient uses can be identified. Utilizing those services as a basis for improving the use of facilities on campus seems worth experimenting.

In practice, the results imply to university campus management organisations that multiple means of conducting businesses, that aim to take underutilized operand resources to better uses, exist. The model that functions best for each project or case depends on how structured offerings and how direct incomes each project aims to deliver. All the models compliment each other, and it is a matter of finding the right balance between them in supporting university core tasks - education, research and societal impact. Both ends of the spectrum are needed in lifelong learning, and require attraction and engagement from the service providers as clients and proactivity from the users as customers of the campus.

For example, if the purpose is to cater for very focused discipline-specific research and the user knows what to expect, the offering is very structured, and the revenue very direct. In this case, the user is in control and finds a way to execute the required tasks. Whereas if the purpose is to support innovative actions, and the user is looking for pleasant surprises - serendipity - then more flexibility is required from both the

offering and the revenue. In the latter case, the service needs to make assumptions based on behavioral data collected earlier of individuals and communities on campus and suggest ways forward in time and in location.

As there are multiple sorts of communities that utilize university campuses for a variety of uses and in a variety of manners, these kinds of services could increase transparency and thus help in making the most out of the available resources. The university facilities today are utilized in an extravagant way because the data of the usage nor the availability of the resources is not communicated nor showed transparently. Through the analyzed types of services it would be possible to provide access to, invite people to, integrate use of and facilitate sharing of facilities which could potentially help in cutting costs of university facilities, diminishing needed amount of space, maximizing serendipitous encounters and improving sustainability of university institutions.

5.2. Limitations

This paper is qualitative and thus limited to analyses of literature and business models of a hundred services, and thereafter eight services in more detail based on their Internet sites. These results are not thus highly generalizable but rather provide an idea of available services that could potentially be tested in the future.

The validity of the results can hence be criticized. No service providers, users, customers, nor clients were interviewed for the purposes of this study which would have provided more realistic insights to how the services function. However, it provides an initial framework with help of which university campus management organizations could improve the efficiency and effectiveness of their campuses by making their operand resources more attractive and accessible.

As the initial framework emerged from the data, and the services were not monetarily nor otherwise quantitatively assessed nor evaluated, the reliability of the results can be criticized. However, due to collaboration of multiple researchers and a large amount of services analyzed, the results indicate weak signals of strategies applied in services that aim to take extravagantly utilized operand resources into better uses.

The initial framework can be furthermore tested and re-iterated in a case where university campus is developed.

6. Conclusions

Due to increasing digitalization, university campuses should be increasingly able to attract people and provide serendipitous encounters and focus less on facilitating individual executive work. With low facilities utilization rates, increasing global competition and scarce monetary resources, university campus management organizations are challenged to come up with more effective solutions to cater for education, research and societal impact. This study suggests that experimenting with business strategies applied in the service clusters of *Inviting to*, *Facilitating sharing of*, *Providing access to* and *Integrating use of* operand resources, could be a potential way forward.

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E4: KIBS and internationalization and outsourcing

Chair: Grete Rusten

XXV. International RESER Conference: Building documentation for building operation – A study based on the theory of planned behavior

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The paper presents an overview of the documentation status quo within the real estate and construction branches and the motivation of planning participants to document their results with regards to building operation. Based on the Theory of Planned Behavior, an extensive online survey and problem-centered interviews with experts were carried out. The results highlight the reasons for insufficient building documentation and show factors and conditions, which could influence the motivation and behavior of the participants.

1. Introduction

A main part of construction projects is the documentation of significant processes and building information. Nevertheless, the documentation is still considered as an annoyance and its importance is underestimated. This is the reason why the documentation is often provided just rudimentarily. That entails that famous and complex buildings fail and produce additional costs, because decisive and important steps are not documented adequately. The integral documentation goes one step further. In this case, cooperation and planning participants are considered. Consequently not one stakeholder is responsible for the whole documentation, but every planning participant contributes to the integral documentation. This minimizes the error rate enormously.

2. Integral Documentation

In the construction and real estate branch, the focus is transferred more to sustainable and lifecycle comprehensive designing. This is also called “integral” project planning and refers to all lifecycle phases of a building from the initiation to the demolition. In traditional planning, the building itself is the focus of consideration. Within the service oriented planning, the objective lies in an optimal satisfaction of the customer demands while using the building (König et al., 2009). To achieve ambitious, functional, technical, economic, social and ecological objectives, the variegated parties have to coordinate their contribution for achievement in a new way along the lifecycle of a real estate (Schäfermeyer et al., 2008; Pfnür, 2011). In comparison to the traditional project planning, this is much more complex because of the increased coop-

eration demand between the planning participants involved and the higher data volume (Both et al., 2013; Kalusche, 2012).

The early designing of building running requires the patency of information, data and documents (IFMA, 2014). Therefore an integral documentation is needed. Here, the various participants of designing, construction, and operation processes are involved to guarantee that the right information in every point of time is delivered and stored

- to the right addressee,
- at the right time,
- in the right format,
- in the right quality,
- in the right place.

Documentation includes the long-dated safeguarding of main information of a project, which is important for later operations (Kalusche, 2012). At the end of the building construction, the documentation has to be complete (GEFMA 198-1, 2012). That means that the planning and construction participants should document the results of their work continuously. But in practice, a large part of project ends with massive information deficits. One well-known reason is that the planning participants understand the documentations just as a sampling of documents, which are produced anyway. Moreover, there is no time to collect the relevant information and data continuously. Another problem is the large amount of involved participants (Kalusche, 2012; GEFMA 198-1, 2012). The broad variety of participants entails a broad variety of transfer and data formats, interpretations of information, and understanding of terms (König et al., 2009). That leads to frictional losses and high costs for additional assessment (Möller et al., 2013; GEFMA 198-1, 2012).

The Theory of Planned Behavior could explain this suboptimal situation, which leads to the necessity of investigation into the present status quo of documentation.

3. Theory of Planned Behavior

Applied to the background of integral documentation, the decision was to use the Theory of Planned Behavior as a basis for the study to analyze how the different stakeholders, who are part of the lifecycle of properties, are dealing with this topic of the documentation and how their attitudes and future behavior intentions are. Moreover we were interested in the motives to perform or not to perform an integral documentation.

Research question:

How is the topic integral documentation in Germany currently being managed and how are the attitudes and future behavior intentions of the different stakeholders, who are part of the lifecycle of properties?

The Theory of Planned Behavior (Ajzen und Madden, 1986) is one of the approaches most frequently used for social-psychological research and has arrested attention

and confirmation by different applications (Armitage and Conner, 2001). The particularity of the Theory of Planned Behavior is that the focus of research is the individual attitude of human beings, in contrast to other exclusively economic theories.

The theory started with the core statement that the behavior of humans is not necessarily connected to their attitudes (Eagly and Chaiken, 1993; Zanna and Fazio, 1982). Based on this phenomenon, Ajzen developed the theory of reasoned action (Ajzen and Fishbein, 1977), on which the Theory of Planned Behavior grounded (Ajzen and Madden, 1986). According to this model, behavior is particularly determined by a concrete behavioral intention. This central factor of behavioral intention is affected by three conceptually independent determinants of intention (Ajzen and Madden, 1986).

The first determinant conducts the attitude toward the behavior and refers to the degree to which a person has an advantageous or disadvantageous evaluation of the behavior. The second predictor is a social factor named subjective norm. This predictor refers to the perceived social pressure of the society to execute or not to execute a specific behavior. The third antecedent of intention is the degree of perceived behavioral control, which refers to the expectation of the level of difficulty the performance of behavior is. Related to this, past experiences serve as references and are compared to the current situation (Aronson et al., 2008).

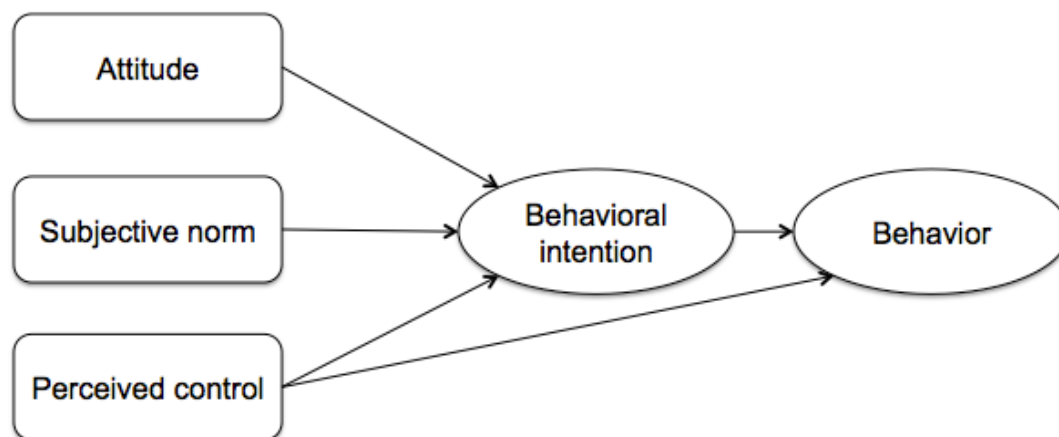


Fig. 1: Ajzen and Madden's model (1991)

The main statement of the theory is, the more favorable the attitude and the subjective norm are regarding a behavior, and the majority of the perceived behavioral control, the more likely an individual's intention will be to perform the behavior under consideration (Kanning et al., 2008).

The predictor Attitude describes the attitude of a person towards determined circumstances. The more distinct this attitude is, the stronger the behavioral intention and the higher the probability to show a specific behavior. The attitude of a person is influenced by the potential consequences of his/her behavior. As a general rule, persons strive for a determined behavior if their personal evaluations of this behavior are positive (Brandt, 2010).

The Subjective norm is defined as “the perceived social pressure to perform or not perform the behavior” (Ajzen, 1991). The behavior of a person is influenced by normative beliefs which are concerned with the likelihood that important referent individuals or groups approve or disapprove of performing a given behavior. Consequently the subjective norm refers to an individual perception of the social environment to perform or not perform a behavior. If a person has the impression, that a determined behavior is common or desirable, it will have a strong influence to the behavioral intention (Brandt, 2010).

The Perceived control as the third determinant of behavioral intention describes how a person feels to realize a successful planned behavior. It is possible that the realization of a determined behavior is easy or it is necessary to spend a lot of effort and resources. At this connection, the control is influenced by external factors or by the missing trust in the own capability (Brandt, 2010). At the same time, perceived controllability also exerts a direct influence on behavior realization. In this case the Perceived control depends not on the other determinants, Attitude and Subjective norm (Ajzen, 1991).

For the analysis of the behavior and behavior intention regarding to the integral documentation in the lifecycle of properties, we had to formulate focused hypotheses according to the theory.

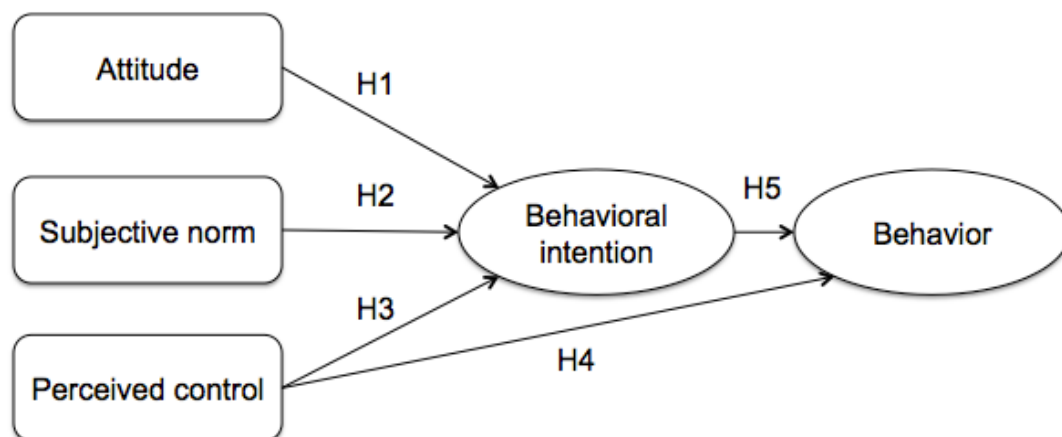


Fig. 2: Ajzen and Madden's model with hypotheses

Hypothesis 1:

The more positive one's attitude towards integral documentation, the more strengthened the behavioral intention in accordance with the integral documentation is to act.

Hypothesis 2:

The higher the perceived pressure of the social environment for the implementation of integral documentation, the stronger the behavioral intention is to act accordingly.

Hypothesis 3:

The higher the perceived control is designed in terms of integral documentation, the stronger the behavioral intention is to act according to the documentation.

Hypothesis 4:

If the perceived control of integral documentation is clearly defined, then the behavior is influenced to documentation.

Hypothesis 5:

The stronger the behavioral intention is to act in accordance with the integral documentation, the more likely the behavior is to carry out the integral documentation.

4. Methodical Approach

In the beginning of the students research project, the definition of the academic void and the description of the research guiding question were pointed out, which leads to the research design. On the basis of the existing survey and the preponderant on practice focused literature, the following question was formulated: "How is the issue of integral documentation currently handled in Germany, and how are the attitudes and future behavioral intentions of the participants of the buildings lifecycle pronounced?" For deep insights into the structure of integral documentation, the survey took a deductive and inductive approach. Though, the stated objective was to understand and use both approaches as complementary elements and two different perspectives on one and the same object of research. The formal deductive approach along the Theory of Planned Behavior (Ajzen und Madden, 1986, Ajzen, 1991) should generate a tentative verification respectively falsification of the hypothesis's (Kromrey, 2006). For the case study method, problem centered interviews (Mayring, 2002; Lamnek, 2005) were performed to understand the research object in more depth and to support and concretize the results of the quantitative survey within the scope of the multiple case study (Yin, 1984). Particularly through this method mix, a transparent and complete picture of the reality could be given. This also serves as the argumentative interpretation safeguard.

To achieve the comparability of the results and a similar interpretation of the respondent (questionnaires) and the interviewee (interviews), a general definition of integral documentation was produced: "In integral documentation, the different participants of designing, construction, and operation processes are engaged lifecycle across. This ensures that the right information in every point of time is delivered and stored to the right addressee, at the right time, in the right format, in the right quality, in the right place." The survey techniques refer to this definition.

In the quantitative approach, a questionnaire was carried out, which was based on the hypothesis and the formulation of the appendant variables along the theoretical and hypothetical construct. Finally, the measurement model was displayed formatively.

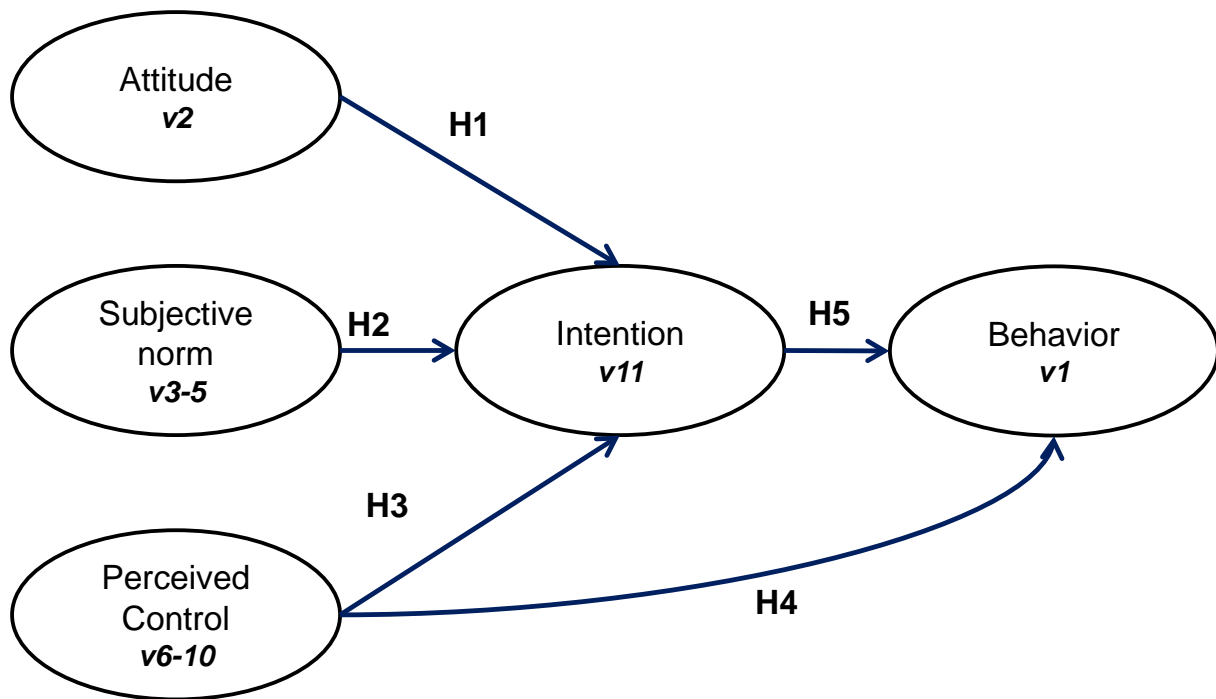


Fig. 3: Hypothesis and model based on Ajzen and Madden

According to the definition of the integral documentation, related variables were derived based on the theory (see table 1). In this connection the answers have been carried out by means of closed questions on a six-point scale.

Table 1: Variables and items in the questionnaire

No.	Dimension	Scale	Question
1	Behavior	a	To what extent is an integral documentation implemented in your company already?
2	Attitude	a	In my estimation, the integral documentation is an essential part of the implementation of the life cycle concept of real estate.
3	Subjective norm	a	In my estimation, the vast majority of my clients is the assessment that an integral documentation is an essential performance component of the implementation of the life cycle concept of real estate.
4	Subjective	a	In my estimation, the vast majority of my employees is

	norm		the assessment that an integral documentation is an essential performance component of the implementation of the life cycle concept of real estate.
5	Subjective norm	a	In my estimation, the vast majority of my competitors is the assessment that an integral documentation is an essential performance component of the implementation of the life cycle concept of real estate.
6	Perceived Control	a	To what extent are you estimating that an integral documentation (e.g., consulting, etc.) can be implemented by an additional remuneration of participants readily?
7	Perceived Control	a	To what extent are you estimating that an integral documentation can be implemented by normative standards (eg. DIN, GEFMA, gif, etc.) readily?
8	Perceived Control	a	To what extent are you estimating that an integral documentation can be implemented by the expertise of the staff readily?
9	Perceived Control	a	To what extent are you estimating that an integral documentation can be implemented by the additional support of IT (e.g. BIM, CAFM, etc.) readily?
10	Perceived Control	a	To what extent are you estimating that an integral documentation can be implemented by a documentation agent for the overall project readily?
11	Intention	b	How strong is your intention to develop your business significantly in the next 6 months in terms of integral documentation?

Notes: with all questions "not specified" is also offered as an option; Scale a) 1 = completely to 6 = not at all, scale b) 1 = very strongly to 6 = not; no answer = missing value

The questionnaire was applied on personal contacts and social networks, which mainly deal in practice with these technical contents. The focus was on groups within the scopes of project development, architecture, construction/ project managers and real estate consulting firms.

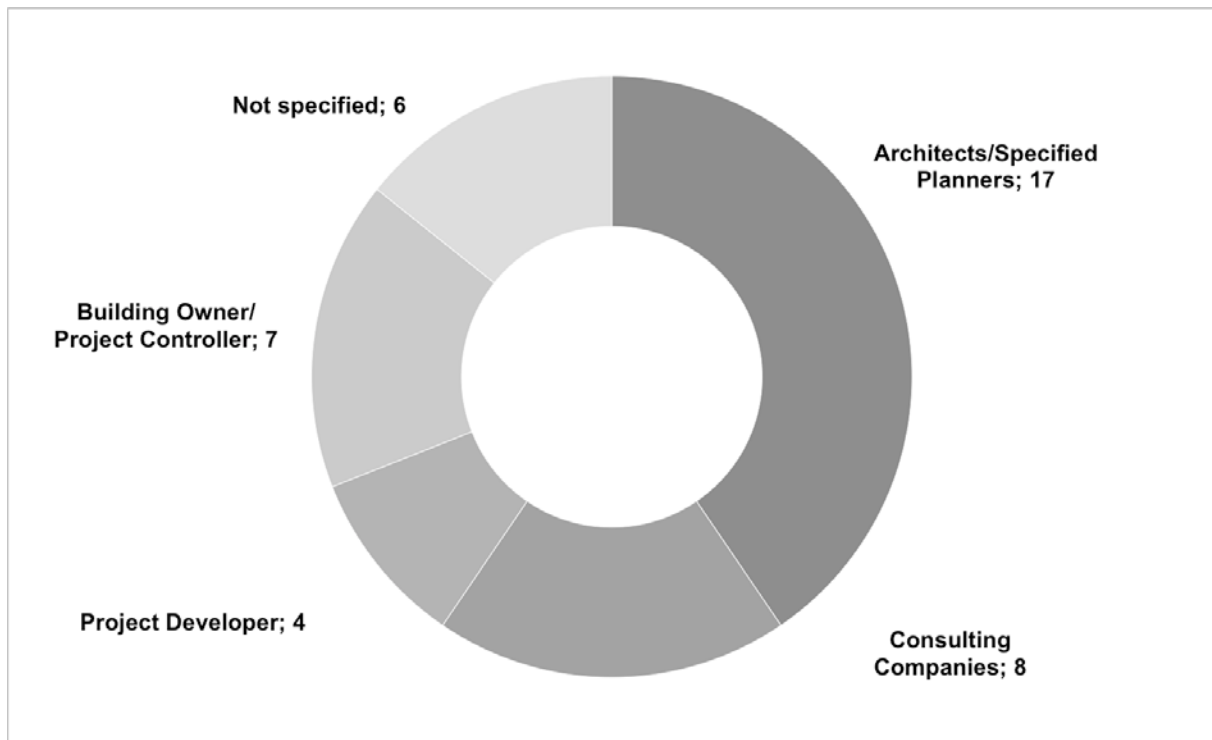


Fig. 4: Group orientated records in the questionnaire

To achieve the highest possible validity of the evaluation, only the records were incorporated into the analysis, which have been completely filled regarding the variables v1 - v11 by the people interviewed. Dropouts of the questionnaire have not been studied in detail with respect to the response behavior and also not considered in the analysis. In addition, the remaining records (45) were subjected to a detailed analysis in terms of the response behavior. Anomalies and abnormalities in the response behavior were found in three more records, which were excluded from the close consideration and evaluation. Due to the not normally distributed data and the small number of cases, a bootstrapping at 95% confidence interval was carried out with 1.000 bootstrap samples, which enable a further classification of the data and the results. Through this proceeding, the particular correlations could be verified. In this context, the degree of (relative) influence can be determined by the method of squared correlation coefficients (Homburg und Klarmann, 2012).

In the context of the qualitative study, the collection of data was carried out on the basis of problem-centered interviews and qualitative content analysis along the multiple case study plan (Mayring, 2002). Due to the different participants in the integrated planning process of a property, the multiple case study (multiple case with embedded cases) was selected as the research method (Yin, 1984). It has the objective to examine several cases and to derive laws, observations, comparisons, and generalization from the experiences of individual interviewees.

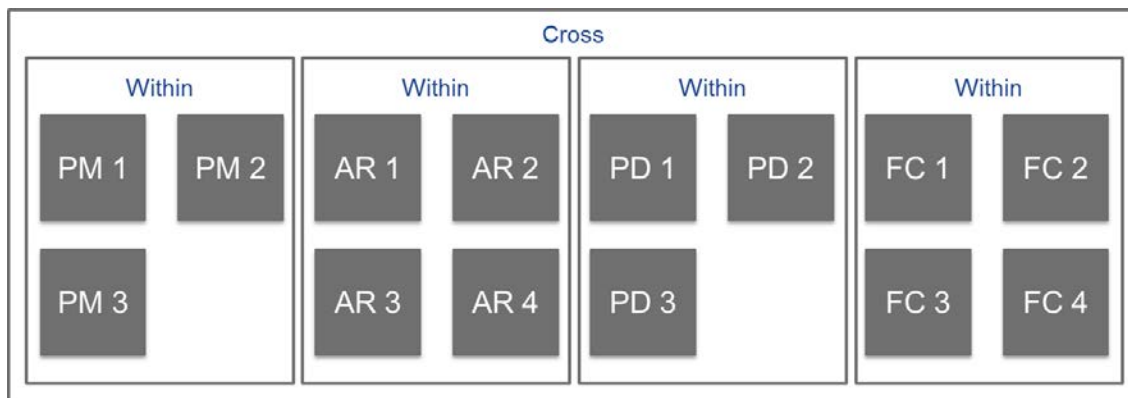


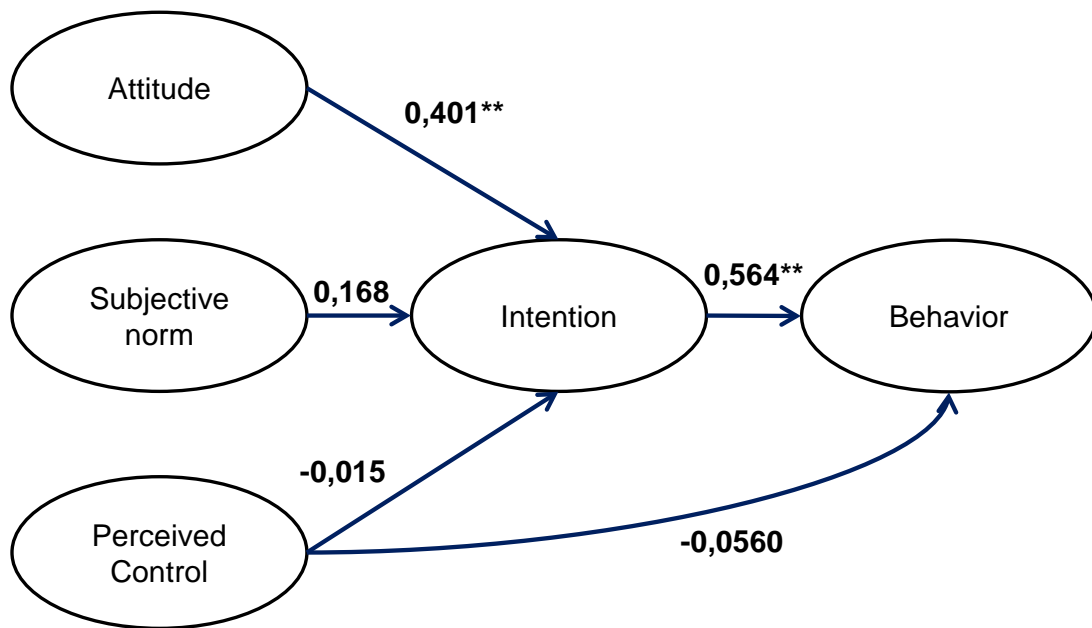
Fig. 5: Structure of the multiple case study

Notes: PM = Project Manager / End User Client, AR = Architect, PD = Project Developer, FC = Facility Consultants

With all of the companies involved in these cases, analogous problem-centered interviews were conducted. The conversations were recorded with the consent of the parties and transcribed in the further course. The transcript was made available to the interviewees in understanding the communicative validation available again. After, all text components were disassembled, paraphrased and assigned to qualitative content analysis to make them accessible to a detailed evaluation and representation. The key questions within the interviews were closely modelled on the existing questionnaire for the quantitative study group in order to precisely explicate these arguments and interpretations. As part of the within-case analysis, the statements of this group were shown and described. Then, they were compared again at a higher level of abstraction in the context of cross-case analysis with the other groups (cases).

5. Results and Findings

In the context of the Theory of Planned Behavior, the hypotheses H1 and H5 are assumed in alternative hypotheses. For the hypotheses H2, H3 and H4 the respective null hypotheses had to be maintained.



Notes: * $p < 0,05$; ** $p < 0,01$

Fig. 6: Results for Integral Documentation

Away from all limitations of the study performed and the current state of interim results, initial estimates and indicators for the additional scientific and practical connectivity can be derived, especially in combination with the qualitative results of the content analysis. On one hand, it becomes obvious that a positive attitude to the integral documentation affects the general behavior. In relation to the other constructs, approximately 85% of the content of the declaration of behavioral intention (intention) refers to the construct “positive attitude” towards integral documentation¹. This behavior intention also correlates positively with the belonging behavior.

According to the qualitative content analysis the stakeholder interviewed are of the opinion that integral documentation is a significant part of the lifecycle orientation. Nevertheless, the integral documentation is used in different contexts because of the disagreement regarding the conceptuality. Architects and specialist planner belong to

¹ Normalized squared correlation coefficient. To process of the squared correlation coefficient see Homburg and Klarmann (2013).

the group with the most analog understanding of the term. According to the opinion of the different stakeholder interviewed, the integral documentation does not follow this comprehensive knowledge. Rather, the documentation depends on specific construction projects, but has less universal and generic character. Individual groups built their own standards of documentation and archiving, which they used in their projects; other alternative systems are regarded as time consuming and maintenance-intensive. In this context, it is important to mention that the documentation not only integrates building components and elements. Rather, the holistic and sustainable view of processes and the results are focused to create the hybrid product more efficient along the entire lifecycle. Nevertheless, this is more likely a sequential planning and perspective. Particularly, the maintenance effort of data and the assurance of the necessary actuality still present a big challenge for the participants. Regarding the integral documentation, the FM-consulter have a comprehensive and diversified understanding, but are generally not those who must also implement it. They are of the opinion that professional and temporal barriers between the participants of the lifecycle constitute an obstacle of the holistic implementation.

In this context, it becomes obvious how closely product and service are woven together in the hybrid value added. But how the specific service is planned, performed and monitored, remains uncertain, if necessary input factors of the property are not or not actually documented. These circumstances are reflected by the most projects in practice. Particularly, frequent changes of ownership or fast project development apply very often in practice before the general process of documentation starts. Almost every stakeholder interviewed confirms that there is a significant connection between the documentation of products (building/real-estate) and of operational performance processes (building management).

25 of 42 study participants were of the opinion that the integral documentation could contribute to eliminate planning errors by regular information exchange.

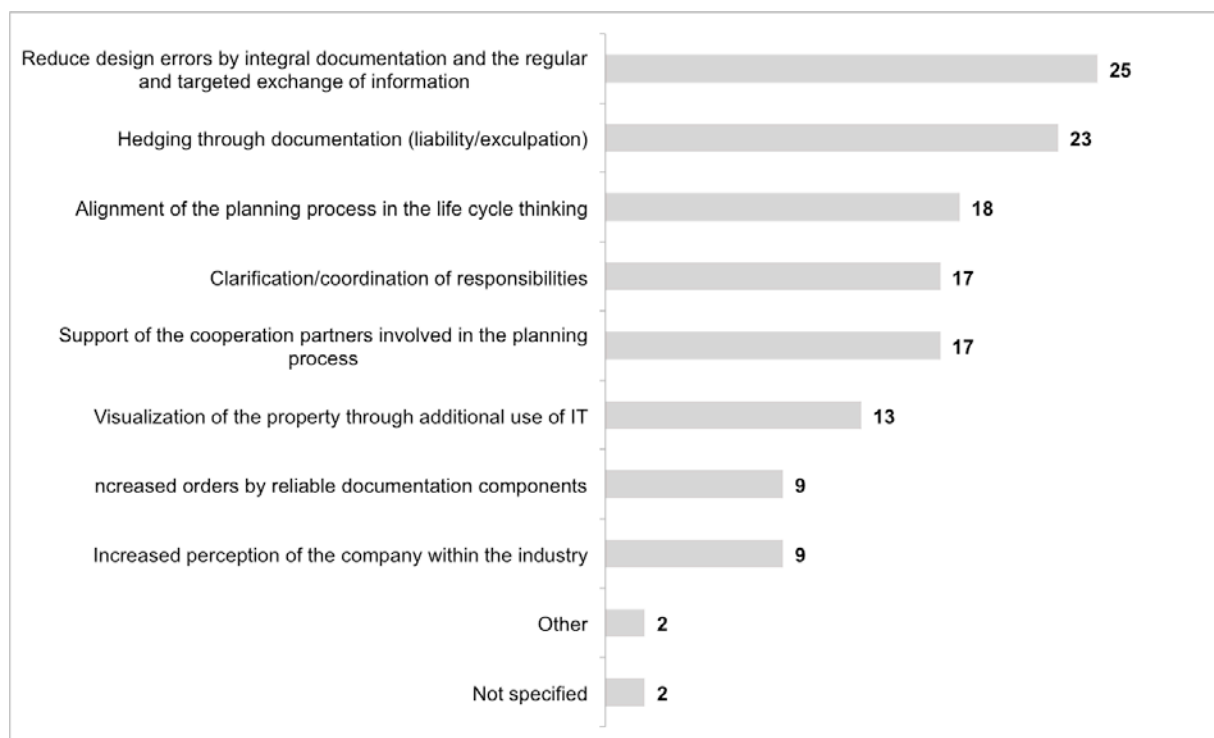


Fig. 7: Opportunities for ensuring a better planning and design process

The conclusion is that the majority of the participants agree to an integral documentation, because the benefit along the lifecycle is clearly evident. Nevertheless, just a small part of stakeholders adheres to these guidelines or the way of documentation; integral documentation is important, but in some cases a bothersome duty.

Regarding to the subjective norm (the noticed pressure to change the behavior or the intention), the employees are decisive. In the opinion of the respondents, additional fees and / or other normative standards (VDI, GEFMA, gif, etc.) will not be necessary to implement an integral documentation. Here, the qualitative study supplies comparable results. Especially in the area of staff, a differentiated picture is emerging. While especially consultancies and architects/specialist planners represented the view that employees are a major reason to implement the integral documentation, mainly builders/project manager and project developer cannot completely agree.

Furthermore, some participants of the quantitative study and some interviewed people are of the opinion that additional norms and standards for the implementation of the integral documentation are required. This presentation and evaluation is of considerable interest, just facing the formation of the documentation using BIM. Ultimately, however, a binding documentation standard with the exchanged documents would possibly also replace project- and customer-specific solution alternatives. According to the documentation standards and the timeliness and completeness of the information, this real estate projects would be clearly comparable, as it is the case at the present time. Especially the group of architects and planners relies on normative guidelines like the designation of the HOAI. The HOAI gives only rudimentary information on standardized implementation regarding the lifecycle. Especially the future will show how BIM can map the required documentation uniformly, or if not procedural documentation standards are needed to reduce information asymmetries between the stakeholders in order to create the hybrid product as efficiently as possible.

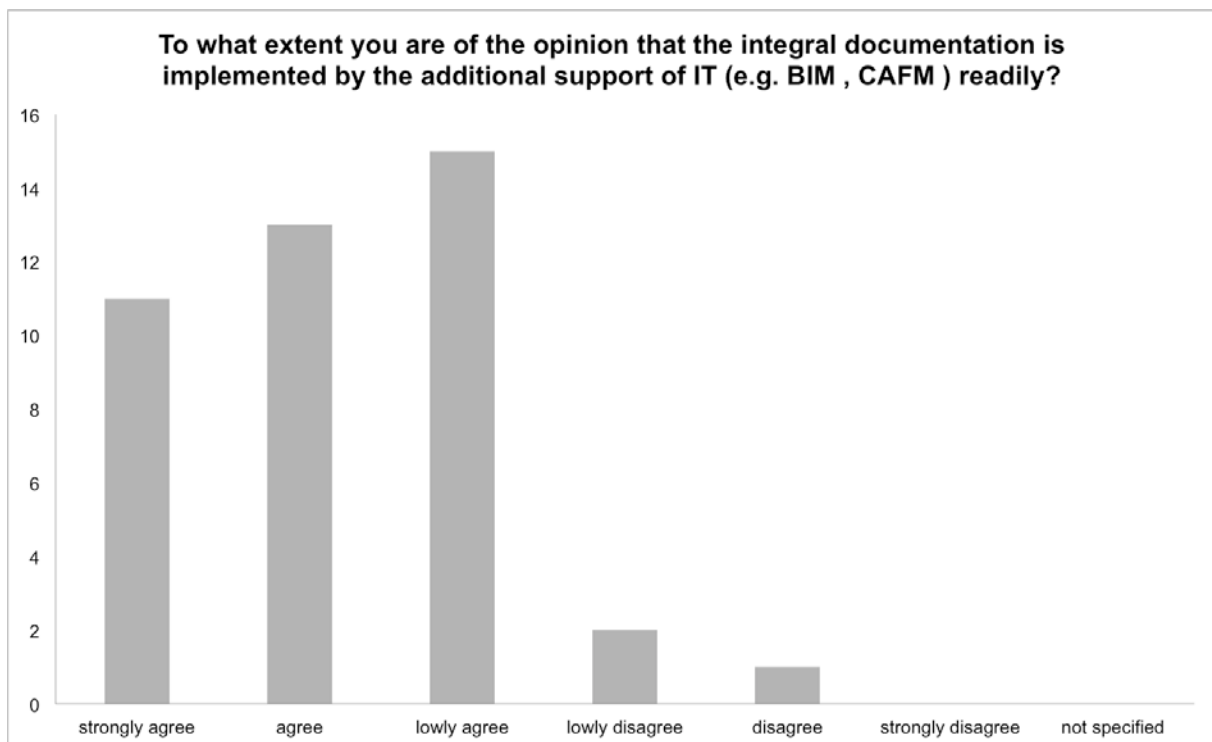


Fig. 8. Implementation of BIM (Building Information Modeling)

Although not significant, especially the competitors could represent an important role in the future. The more companies forge ahead and implement this holistic form of support for the real estate project, the higher could be the perceived pressure to change the own behavior in the future. Especially the project developers interviewed do not see a significant competitive advantage by an integral documentation on the currently market. At this connection, other topics with clearer relevance seem to be in the main focus. Moreover, also the question rises whether a customer would pay a pricing supplement for a property with integral documentation, or whether better credit conditions by the financing bank are provided as a result of an optionally lower risk. In this context, a need for further research can be formulated.

However, customers seem to have no significant influence on the behavioral intention. Sometimes, it can be presumed that the customers and their documentation structure in practice are so fragmented and heterogeneous that there is no uniform and contractually secure base of understanding about the nature and the scope of the integral documentation. Also as part of the qualitative study, corresponding content were recorded. Therefore, customers seem to have such a sophisticated idea of what needs to be documentation, so that the customer also determines the contents and consequently the project-related standard. According to the participants interviewed, it is primarily the customer who determines the relevant conditions and also the used standards, contents and formats. The stakeholders which are involved in the planning process of the hybrid product would especially follow and implement this customer request.

In this connection, the quantitative evaluation showed that the use of BIM is not the complete remedy of choice and does not pick up all the challenges of the practice to solve the problem. In that regard, BIM can be associated with the supporting area in the context of information logistics as a tool for implementation; its use alone will not improve any project documentation. Apparently, the value-added partnership and cross-stakeholder information exchange needs to be rethought and formulated. The participants interviewed indicate that currently online platforms are available for data exchange. The architects and planners just sometimes consider BIM-tools critically, because these solutions are not yet fully developed from the perspective of the respondents to satisfy the practical requirements.

Due to the currently very heterogeneous implementation and perception of integral documentation on the market, the question was asked whether a separate documentary representative in the lifecycle could dominate the control over the processes better. Although, in the quantitative study cannot derive any significance, just the interviews reflect a heterogeneous impression. It became clear that in particular the determination of responsibility in the lifecycle is critical and is assessed differently by many respondents. On one hand, some participants interviewed represented the view that the responsibilities over the lifecycle phases should change (e.g. by architect to FM service), others are of the opinion that there should be a charge on the phases. Similarly inconsistent presents the image of who is the best stakeholder to implement the integral documentation. In many cases, the responsibility is at least seen in a respective other group.

6. Conclusion

The integral documentation – combined with the design of integrated planning – is a currently significant addressed issue in Germany. In particular, the number and the extent of failed major construction projects force to implement new forms of collaboration and cooperation, and not to remain in the status quo. The present study makes a significant contribution to the fundamental understanding of integral documentation and to possibilities of successful implementation. It was found that BIM for example, is not alone in the position to take up the multifaceted challenges in the planning process exhaustive and all encompassing. According to the authors, the starting point of data, the objectives of the project, and of the documentation as well as the value-added partnership of cooperation partners have to be at the center of considerations in Germany. A purely technocratic regulation of an instrument will ultimately remain in the case status without any change in the core. Against this background, the formation, structuring and maintenance of a functional cooperation for the creation and operation of real estate (understood as a value-added partnership of the hybrid product) should be given more attention than before. Only if the procedural sequence of tasks is matched transparent connected with the documents and information required the responsibilities between the participants are present.

7. Limitation

The conducted quantitative study must be considered against the background of the rather small number of the existing case. In that regard, the statements should investigate once again in a major, also international study. Although the quantitative and the qualitative statements generally correspond in many respects, the application of structural equation model for confirming the statements should be required to interpret the present interim results mainly as preliminary results. In particular, the complexity of the model as well as the formulation of the variables (formulation of the items) should be reviewed in a further study.

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Internationalization of Services: The case of KIS (Knowledge-Intensive Services).

Are the traditional models applicable?

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Abstract:

The literature on the internationalization of firms has traditionally been applied to goods, since they have been more subject to international transactions. This is due to services having had some features very different to those of goods, which have prevented them, in some cases, from adopting certain forms of internationalization. However, in recent decades there have been some changes in the nature of services that, alongside the emergence of new information technologies and new contractual arrangements for accessing other countries, etc., have permitted their foreign expansion. In this context, the objective of this work is to analyse the extent to which some of the traditional theories on the internationalization of services have been adapted and what changes should be considered in order to justify the adaptability of such theories to services and, in particular, to knowledge-intensive services.

Key words: Services, Knowledge-Intensive Services, Internationalization

JEL: F21, F10, L80, L90.

Thematic Area: FDI and multinational companies

1. Introduction

In recent decades there has been a great international expansion in services. In particular, said growth has been influenced, according to Muñoz-Guarasa (2001, 125-126), firstly, by the growth in the consumption of services for families in the domestic economy, which has generated great expectations for business and for profits in firms, leading to the firms wanting to use these advantages not only in their local markets, but also beyond their national borders. Secondly, the organizational changes in firms have given rise to the outsourcing of some phases of the production process, such that firms outsource certain services (advertising, accounting services, etc.) to other independent firms in other countries. Thirdly, the process of deregulation in national economies have allowed the liberalization of markets by facilitating easier access for firms, not only resident ones but also foreign, to these markets (telecommunications, personal services, financial services, insurance, etc.). Fourthly, advances in information technology and telecommunications, as well as the emergence of new services based on the use of information and knowledge, and innovations in transportation, have encouraged the increase in trade in services that were not being traded before. The latter two factors have also been identified by Miozzo; Miles (2002, 24). Thus, all these reasons have led to some changes in the nature of services and more specialization in services being produced, as well as a great development of knowledge-intensive services and a significant increase in their capacity to internationalize.

The process of internationalization of service firms may be driven by the same variables that affect manufacturing firms. However, the intensity and direction of some key relationships require consideration of the specific characteristics of services (Patterson *et al.*, 1999). These distinguishing features of services influence their mode of internationalization and have raised significant doubts regarding the appropriateness of applying internationalization theories for manufacturing firms to those businesses that provide services.

Therefore, the objective of our analysis will be to analyse the applicability of some theories of internationalization on imperfect competition to services, in general, and to knowledge-intensive services, in particular, starting from the theoretical and empirical literature. In addition, we will raise possible changes that would have to be included to improve such applicability. Therefore, first, we analyse the Theory of Industrial Organization, second, Transaction Cost Theory and Internalisation and, third, the Eclectic Paradigm Theory. We finish by providing a set of conclusions and we propose future research.

2. Characteristics of Services and KIS

Over time, services have evolved and have gained in importance. Specifically, their traditional features (intangibility, heterogeneity, inseparability and non-durability) have been questioned by various authors, among which are found Beaven; Scotti (1990), Wright (1995), Winsted; Patterson (1998), Grönroos (2000), Loveloch; Wright (2001), Miozzo; Soete (2001), Johnson; Gustafsson (2003), Vargo; Lusch (2004), Edvardsson *et al.* (2005) and Moeller (2010). First, the intangible nature has been criticized because this feature of the transformation process is not the specific service, but the intangibility of its offer (Moeller, 2010, 362); even if the client possesses nothing tangible when the service has been produced, generally, there are many objects that do have that feature and that participate in its activities. Second, the heterogeneity feature has been little questioned since it can be caused by human interaction in goods as well as in services (Zeithaml *et al.*, 1985; Gummesson, 2000; Vargo; Lusch, 2004; Moeller, 2010) as they all include customer engagement. Third, the inseparable feature has been criticized because many services can be separated in time and place between the production and the consumption using new technologies of information and communication, allowing its internationalization. Finally, the non-durability feature has changed since services can be stored in systems, buildings, machinery, knowledge

and people (Moeller, 2010, 364). For example, software systems can be stored in the computer system or education services in the knowledge acquired by the people who receive them.

Of the various activities that make up the service sector, it is the knowledge-intensive services that have achieved the greatest growth and importance in recent years. Knowledge-intensive services (KIS) are characterized by having a set of own intangible resources such as human capital, knowledge, innovation, network relationships, among others, and thanks to their organizational resources and learning are able to transform them into dynamic capabilitiesⁱ of networking, of knowledge and of innovation that allow them to better adapt to the international market opting for strategies of following the customer. In general, although KIS are characterized by their orientation to the marketⁱⁱ, locationⁱⁱⁱ and for their human capital^{iv}, they can develop the following capabilities, differentiating them from other services:

- The ability to create knowledge^v: KIS, through their organizational resources, have the ability to transform all the information acquired from the different agents of the knowledge market and, in this way, provide personalized services with high added value for the customer.
- The capacity for innovation^{vi}: KIS participate in the innovation process and develop such capacity through three functions. First, as facilitators, since they help customers develop their own products or processes. Second, as carriers, transferring the developed innovations elsewhere and, finally, as sources of innovation to meet the needs of customers (Smedlund; Toivonen, 2007, 197). Therefore, innovation and KIS are especially linked (Strambach, 1998, 5-9). The capacity for innovation is transferred to the organization, to the extent that they are able to offer new services with high added value for the customer.
- The ability to create networks^{vii}: KIS have the capability to create networks both in the exchange of information between customers and suppliers, as well as between the employees and the organization itself as a whole, because both the founders as well as the employees need to acquire knowledge from all the market players.
- The ability to learn: KIS are able to assimilate the new knowledge acquired from the internationalization process and from the networks themselves and partnerships with market agents, and transform them into the very organizational know-how of the firm^{viii}. This capacity to learn from the organization itself influences the service provided to customers by providing them with high value added and personalized services.
- The ability to internationalize: this capability is found in harmony with the dynamic capabilities that KIS firms possess, since they have intangible resources that enable them to learn from the market, from their networks and alliances and from the organization itself (Nelson; Winter, 1982; Dosi, 1988; Lado *et al.*, 1992; Teece *et al.*, 1997), thus the internationalization of KIS is favoured by the high degree of acquired knowledge.

3. Empirical and theoretical literature referring to some theories of internationalization

Now we will look at the applicability of some Theories of Internationalization of Imperfect Competition^{ix} (Theory of Industrial Organization, Transaction Cost Theory, Internationalization Theory and Eclectic Paradigm Theory) to services and, especially, to KIS, from the empirical literature (Table 1) and the theoretical.

Table 1: Empirical studies of cases of internationalization of service firms

Theory of Industrial Organization	Katrishen; Scordis (1998) Williamson; Shaw (2001) Constratista <i>et al.</i> (2003)
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	Bhagwati <i>et al.</i> (2004) Lommelen <i>et al.</i> (2005)
Transaction Cost Theory and Internalization Theory	Masten <i>et al.</i> (1991) Walker; Poppo (1991) Kim; Hwang (1992) Erramilli; Rao (1993) Fladmoque-Lindquist; Jacque (1995) Murray; Kotabe (1999) Poppo; Zender (1998) Brouthers; Brouthers (2003)
Eclectic Paradigm Theory	Tallman (1991) Argawall; Ramaswani (1992) Li; Guisinger (1992) Abdul-Aziz (1995) Dunning; Kundu (1995) Brouthers <i>et al.</i> (1996) Tatoglu; Glaister (1998) Alexander; Myers (2000) Singh; Kundu (2002) Dicken (2003) Javalgi <i>et al.</i> (2003) Bryson <i>et al.</i> (2004) Ekeledo; Sivakumar (2004) Rugman; Verbeke (2004) Bouquet <i>et al.</i> (2004) Cole <i>et al.</i> (2007) Faulconbridge; Beaverstock (2007) Javalgi <i>et al.</i> (2011) Abdelzaher (2012)

Source: Prepared by authors

3.1. Theory of Industrial Organization

The Theory of Industrial Organization according to Hymer (1960)^x focuses on explaining the reasons why firms may be interested in investing abroad to have ownership advantages, regardless of the innate advantages that other firms in the host country possess (economy, language, law, politics, etc.). Principally, Hymer (1960) highlighted three types of ownership advantages. First, the economy of scale benefits derived, mainly, from technology, from marketing or from management of the organization, which allow the firm to reduce its average costs. Second, the advantages of product differentiation, which consist in the differentiation of the design or the physical quality of the competing products, of the brands, of their advertising efforts, etc. Third, the absolute cost advantages such as the control of superior production techniques, imperfections in the market of the factors of production, etc. Thus, the possibility of obtaining such advantages enables the firm to set prices below competitors. Later, Johnson (1970)^{xi}, on the base established by Hymer (1960), introduced as a key factor in the development of his analysis, the feature of public good in innovations. The author deals with exploiting the same technology and innovation initially developed in other countries. Furthermore, the firm could exploit and obtain monopoly rents with a very low marginal cost.

The authors Katrishen; Scordis (1998) and Bhagwati *et al.* (2004)^{xii} consider that the Theory of Industrial Organization would be applicable to services in general, as they are characterized by achieving

large economies of scale (Markusen, 1989; Von Marrewijk *et al.*, 1997). Thus, the increase in their specialization and differentiation of knowledge enables them to provide services with predictable and quality features, granting them economies of scale and scope and improved delivery times (Miozzo; Soete, 2001, 163-166). However, Boddewyn *et al.* (1986) and Buckley *et al.* (1992) show that this theory could be relatively well accommodated through simple modifications and re-workings, given that the internationalization process may differ between manufacturing and services (Majkgard *et al.*, 1998), mainly due to the nature and features of services, especially KIS.

Lommelen *et al.* (2005) arrived at a specific model for service firms in which they concluded that the factors that influence the choice of the mode of entry are different for goods firms than for those of services, although both have ownership advantages to exploit. In this model, the factors of production of the target market are eliminated. Furthermore, the factors of the mode of entry and those of management behaviour are also added. As well, they concluded that internal factors could be influenced by the organization. Subsequently, Javalgi *et al.* (2007), based on Lommelen *et al.* (2005), proposed a model called "Framework for internationalization", which deals with the factors that influence the strategy of entering the international market, since the internal factors are different for firms providing services and those selling goods (Zeithaml *et al.*, 1987; Regan, 1963; Rathmall, 1974; Bateson, 1989; Majkgard *et al.*, 1998). Specifically, the know-how, the cultural and regulatory knowledge of the company itself or the knowledge derived from the experience of the founder, among others, are more important for service firms because due to the characteristic of inseparability between production and consumption, what is needed is continuous interaction with the customer and, in this way, personnel that convert the tacit knowledge obtained from the customer into explicit knowledge (Nonaka; Takeuchi, 1995), thereby facilitating the learning process within the company. Therefore, the capacities of human capital are more important for the development of the internal factors of service firms than for businesses providing goods. Owing to the scarcity of empirical studies devoted to the applicability of said model of industrial organization to services, we highlight the study of Williamson; Shaw (2001) referring to the tourism sector, which adapts the Theory of Industrial Organization to this sector, using as advantages the ownership of innovation.

Therefore, although the Theory of Industrial Organization would generally be applicable to services, since any firm in the tertiary sector with ownership advantages in economies of scale, differentiation or absolute cost advantages could choose to exploit them in foreign markets, reducing the prices and obtaining higher profits than firms previously located in that country, some modifications to the theory should be introduced. Firstly, the flexible nature of services to adapt to changes more easily, the differentiation of services and the intensity of human capital should all gain in importance, since these theories mainly focus on firms in the capital-intensive secondary sector. In this way, Contractor *et al.* (2003), in their study of the service sector, rely on economies and then on diseconomies followed by diminishing returns, which are associated with very internationalized firms, dispersed markets, areas with large cultural distances and high costs of coordination. That is why one might think that the benefit of having ownership advantages for service firms is reduced in a short period of time due to their peculiarities. In other words, most of the services are consumed at the time at they are provided. Thus, it is necessary to have the maximum market information to determine the degree of customer satisfaction due to the heterogeneity of the tertiary activity. Secondly, we believe that, in order to be better adapted to the service industry, one must include, in addition to the said ownership advantages, the factors of the market of the destination country itself, since they relate to the nature and characteristics of the services (Boddewyn; Perry, 1986; Bhagwati, 1988; Erramilli, 1990)^{xiii}. Finally, one must include the extension of the period of investment in innovation, not only as an initial situation, as it was shown in Johanson (1970), but it should be constant, principally because some features of services have direct implications for innovation, such as the close relationship between production and consumption, the high content of intangible information in services and in the process, the important role played by human resources as a key competitive factor and the importance of organizational factors in the performance of firms (Sirilli;

Evangelista, 1998, 884). Especially, KIS are market-oriented services (Liesh; Knight, 2007, 296) since they provide personalized services with high added value for customers, implying that they develop innovations more easily than other services.

One must also reflect on the need to further adapt the Theory of Industrial Organization for KIS than for the other services. In this way, KIS need to plan their relationships with clients and ensure excellent communication in order to achieve an increase in the personalization of service and the creation of value added (Amaro *et al.*, 2008, 1532). In addition, we should introduce the importance of networks in the said Theory of Industrial Organization to tailor it to KIS, as they are characterized by establishing networks and partnerships to transfer and accumulate knowledge in the organization in order to raise the overall level of business innovation. As well, one should consider the idea of also incorporating multidirectional learning, which is produced through the establishment of networks in the earlier phases of internationalization (Morgan, 2001, 122).

In short, the Theory of Industrial Organization is well suited to services and KIS. However, one might reflect on the feature of inseparability between the production and consumption of services, which causes them to be intensive in human capital. Thus, the development of ownership advantages such as innovation, knowledge, expertise, etc., depend on the ability of the personnel of the firm to transform all the information obtained from the market into organizational learning and in developing their skills (Hamel; Prahalad, 1994; Nonaka; Takeuchi, 1995). Specifically, KIS need greater adaptation than other services because they are services that are intensive in knowledge and human capital, which allow them to be very different from other tertiary activities. It would be necessary to orient the Theory of Industrial Organization towards the perspective of resources and capabilities^{xiv}, since KIS are characterized by having their own intangible and organizational resources, which allow them to develop the specific advantages of economies of scale, differentiation of the service or absolute cost advantages in their own organizational know-how and, in this way, the benefits in the destination country would last longer. In spite of this, this theory forgets how external factors could affect the learning of the company and thus the process of internationalization.

3.2.Transaction Cost Theory and the Theory of Internalization

Transaction Cost Theory (Coase, 1937; Williamson, 1975, 1985) tries to explain the reasons why a firm finds it more beneficial to directly exploit their ownership advantages through, fundamentally, Foreign Direct Investment (FDI) that transfer them to others, since in that case these firms could incur the costs derived from market imperfections. These costs will depend on the costs associated with the specificity of the assets of the firm. For example, a technology and knowledge-intensive firm has to bear additional costs to prevent its differentiated assets from falling into the hands of competitors. In addition, the agents who work abroad may not work well and these can produce additional costs (Erramilli; Rao, 1993; Klein *et al.*, 1993; McNaughton; Bell, 2001) as well as costs associated with the uncertainty of knowledge in predicting the behaviour of individuals in a foreign country (Williamson, 1985; Gatignon; Anderson, 1988; Rindfleisch; Heide, 1997). This uncertainty could lead to opportunistic behaviour, cheating, misrepresentation of information, lack of accountability and other forms of indecent behaviour (Williamson, 1985). Finally, these costs will depend on the related environmental uncertainty, which are created by the environment of the target market (Brouthers; Nakos, 2004). It refers to the risks associated with the host country, for example, the type of political and legal risk (Williamson, 1985; Erramilli; Rao, 1993; Gatignon; Anderson, 1988). Thus Williamson (1975, 1985) points out that in negotiating an agreement in the market between two parties, the transaction costs would increase in the following circumstances: first, when the qualities of the goods and services involved in the transaction costs are difficult to measure, second, the greater the uncertainty of the environment in which the transaction takes place and, finally, the greater the specificity of the assets involved in the transaction.

With the objective of reducing these costs, the Theory of Internalization then arises (Buckley; Casson, 1976; Casson, 1979; 1982; Rugman, 1981; 1983), which argues that the activities resulting from the intangible assets of the organization, such as knowledge, innovation or the qualifications of personnel, among others, must be internalized, as it ends up being more advantageous to exercise them within the common property of the firm (Teece, 1981; 1982; 1985; Hennart, 1982; Rialp, 1997; Pla-Barber, 2001) than transferring them to another. Rugman (1981; 1982) states that the assignment of ownership rights of the firm to another and the use, by the latter, of an internal market to monitor and control the exploitation of the knowledge as a specific advantage constitutes the fundamental principle of the theory of internalization. A similar argument is that offered by Magee (1977), who argues that the more sophisticated the know-how of the firm is, the more likely is its internalization as a means of appropriating the benefits at the highest level. Thus, the supply of the market by means of internalization makes sense if the benefits, derived from internalizing the activities of the ownership advantages, are greater than transferring said activities to other firms.

Brouther; Brouther (2003, 1196) empirically analysed the influence of transaction costs between manufacturing and services. These authors concluded that Transaction Cost Theory would be applicable to both services and manufacturers, since both sectors seem to react to the different conditions of uncertainty based on transaction costs. However, Erramilli; Rao (1993) indicate, essentially, that the analytical framework of transaction costs is likely to expand in order to develop better-defined models that more accurately explain the behaviour of the election of mode of entry into the foreign country. In addition, besides reducing transaction costs, there may also be other reasons for integration into the international market. Kim; Hwang (1992) support the need to incorporate strategic objectives of the firm globally. Fladmoe-Lindquist; Jacque (1995) explain what types of controls are chosen by service firms in their foreign operations under a conceptual framework that includes aspects related to transaction cost analysis. The conclusion suggests a direct relationship between cultural distance and the international experience of the founder, as well as the uncertainty of the destination country, but is inversely related to the specificity its image presents^{xv}.

The study of Murray; Kotabe (1999) proposes a modification to the model of Williamson (1985) to capture the supply of services, which may be different from goods. Thus they question the internal consistency of Transaction Cost Theory and propose a modification to apply it to services. It involves, first, capital intensity factors in which the greater capital, the harder it is for the service firm to use the internal supply through vertical integration. Second, the inseparability of services, since the greater such inseparability is, the more pronounced is the use of inseparable internal services sources for services that have a high specificity of assets. As services require large investments in training employees in skills and knowledge to provide the services, the supply is limited and the terms to ensure the supply of these services are unfavourable (Williamson, 1985). Therefore, the higher the inseparability of services, the higher the level of domestic supply. For Williamson (1979), the firms that find themselves with uncertainty are able to organize new services. However, Murray; Kotabe (1999) find that for service firms with very specific assets, the high level of uncertainty poses a special risk for them. Third, it involves the frequency of the operations in which transactions involving services are repeated due to the characteristics of inseparability and heterogeneity. Thus, it is more appropriate for firms of specific assets and low standardization, such as knowledge-intensive services, to provide internal services when the frequency of operations is carried out under the following conditions of uncertainty:

- When the quality of services is assessed by a third party.
- When incentives to the supplier to invest in specific assets is required, if they are to provide the service infrequently and the deployment of specialized assets are not being used elsewhere.

- By internalizing infrequent transactions involving a high level of specificity of assets, firms can potentially prolong their sustainable competitive advantage and provide the same service without resorting to modifying the service continuously to obtain a differential advantage.

Therefore, Transaction Cost Theory and the Theory of Internalisation would be well adapted to services in general, although some modifications should be raised. On the one hand, they adapt well, since services contain very specific assets that are not very standardized and are characterized by a high degree of inseparability of production and consumption, which could aid them to internalize their business activities and exploit their own ownership advantages in the international market, because the associated costs of transferring said ownership advantages to other companies could be very high. Furthermore, the heterogeneous and non-enduring nature of the services would entail high transaction costs if the company decides to transfer its ownership advantages to another, since they would have to pass on the knowledge acquired by the human capital and organizational learning, know-how and the organizational culture of the firm, among others. Therefore, the internalization of their activities would create a more beneficial situation. As well, although internalizing activities in order to reduce transaction costs would be a favourable solution for services in general, one must think about the value of certain factors that decrease the degree of uncertainty so that, even though the firm opts for FDI, internalizing their activities allows them to adapt more dynamically to the international market. That is why we think it is appropriate for the importance of the external factors to be valued, for example, the culture of the destination country. Also, cultural incompatibility poses a greater risk for service firms than for goods firms, because they are people-intensive (Samiee, 1999) ^{xvi}. Therefore, the success of service firms focuses primarily on the individual's ability to adapt to the foreign culture in which the business operates.

Regarding KIS, Poppo; Zenger (1998) empirically studied software services, which discussed internalizing all services related to it, such as software applications, end-user support, data network design, assessment decisions, among others. In the research is proposed a logical reasoning based on knowledge, to the extent that co-specialization generates its own know-how and organizational culture which impedes the acquisition of new sources of knowledge, the internalization of activities can reduce value for the company. Therefore, the knowledge predicts the benefits of co-specialization arising from the specificity of the assets focused on the internal culture of the company and on its routines. That is why, when the valuable knowledge is generated by the formation of specific routines and by the know-how of the company, it will prefer to internalize the activities, opting for FDI. However, when the routines and the specific language of the company create obstacles to the creation of valuable knowledge, the ownership advantages are transferred to other companies. These authors, together with Masten *et al.* (1991) and Walker; Poppo (1991), find a positive relationship between asset specificity and internalization. The studies focus on environments where technological change is less frequent and, therefore, the value of the specific language of the company and the routines are more durable.

In short, there exist important doubts about the applicability of Transaction Cost Theory and Internalization Theory to KIS, as neither of the two theories predicts the way in which a firm, from its own resources, can obtain more market information through the establishment of networks and alliances and thus reduce the level of uncertainty. In this regard, it is necessary to introduce some details and modifications to these theories to be able to further adapt them to the characteristics and specificities of the knowledge-intensive services. Thus, it becomes necessary to include:

- The importance of knowledge: knowledge-intensive services are able to develop dynamic capabilities from information obtained from the market and transform it into knowledge and know-how of the firm, making it easier to reduce the level of market uncertainty and quickly adapt to the international framework. Therefore, the associated costs are reduced and it would not be beneficial to transfer such dynamic capabilities to other companies. Thus, exploiting its capabilities would be best for the firm.

- The qualified human capital: which performs the function of feedback between external factors (customers, other service providers, other firms in the same industry, etc.) and the firm itself, developing its own learning and organizational culture. In this way, they represent the fundamental part of reducing the maximum costs of uncertainty associated with international transactions.
- The experience of the founder: KIS are characterized by the previous experience of the founder in the international market, which motivates the strategic environment of their own firms where they acquire the knowledge that results in organizational learning and in the development of their skills (Nonaka; Takeuchi, 1995; Hamel; Prahalad, 1994).
- Networks: the creation of networks facilitates adaptation and dynamism in the international market. In particular, relations between the different international actors (customers, other service providers, other firms in the same tertiary activity, etc.) are important determinants of the transfer of knowledge (Windrum; Tomlinson, 1999) and the development of skills and of the perceived service quality, and enable the sharing of resources, including technical and functional resources. In short, the buyer and seller adapt to each other through the relational processes (Eriksson *et al.*, 1999)^{xvii}.

In general, the theory does not predict how one could reduce costs in terms of the management capacity of the firm, nor the benefit that would accrue with regard to competitors. For example, an ICT-intensive firm could decide to exploit its own ownership advantages instead of transferring technology to other firms out of fear of possible imitations. However, full market knowledge obtained prior to being internationalized through the experience of the founder or the establishment of networks and partnerships would permit it to adapt to market changes and thus achieve greater dynamism and flexibility in terms of the overall picture. Therefore, its capacities are those that allow it to reduce the costs associated with market uncertainty.

In short, Transaction Cost Theory and Internalization Theory, on the one hand, would be well adapted to services, although some modifications may be needed in order to include the features of inseparability, heterogeneity, intangibility and non-durability possessed by service companies. For this, it is essential to include factors that are outside the firm and are important, with the objective of reducing the costs associated with uncertainty, such as the country's culture or the characteristics of the market and human capital, which causes the transaction costs to affect services from a different perspective than goods and, on the other hand, so that these theories are well adapted to KIS, a set of variables should be included that are consistent with the specificity of knowledge-intensive services. As well, this also permits them to reduce the costs associated with market uncertainty and to adapt themselves to the global framework more easily. Overall, the Theory of Internalization has been characterized as being excessively general and for presenting empirical problems (Muñoz-Guarasa, 1999, 67).

3.3.The Eclectic Paradigm Theory

The Eclectic Paradigm Theory tries to offer a more comprehensive and complete perspective from the above theories of imperfect competition. Thus, Dunning (1977, 1988) configures the OLI framework^{xviii} based on ownership, internationalization and localization advantages. First, the ownership advantages refer to the strengths of the firm that is internationalized with respect to competitors in the foreign country, such as advanced technology, economies of scale, better knowledge of marketing techniques, etc. Second, the locational advantages deal with the attractions of the location of countries with respect to the country of origin, which will bring greater value added to the firms, for example, the economies of agglomeration, among others. Finally, there are the advantages of internalization, which consist in reducing the costs associated with market transactions. Therefore, a firm is internationalized in terms of the OLI framework if it has competitive advantages over companies in the destination country.

There are two seemingly contradictory points of view concerning the applicability of the Eclectic Paradigm Theory to services. On the one hand, several authors such as Weinstein (1977); Yanopoulos (1983); Terpstra; Yu (1988); Agarwall; Ramaswami (1992); Miller; Parker (1998); Dicken (2003); Cole *et al.* (2007) have argued that the eclectic paradigm is applicable to services, since there should be no distinction from manufacturing because the FDI would be the preferred route for both. However, on the other hand, there are those authors who say that the crucial differences between goods and services make it difficult to generalize the Eclectic Paradigm Theory for services and, therefore, the paradigm should be applied starting from the unique characteristics of services (inseparability, heterogeneity, non-permanence and intangibility), or with some modifications or adaptations to said model (Carman; Langeard 1980; Boddewyn *et al.*, 1986; Sharma; Johanson, 1987; Li; Guisinger, 1992; Erramilli; Rao, 1993; Dunnig 1993; Campbell; Verbeke, 1994; Gronroos, 1999; Bouquet *et al.*, 2004; Bryson *et al.*, 2004; Ekeledo; Sivakumar, 2004; Rugman; Verbeke, 2008; Abdelzaher, 2012). Both perspectives are developed below.

Argawall; Ramaswami (1992) studied the choice of the mode of entry of equipment leasing service firms versus goods manufacturers and found no differences, although they expressed doubt with respect to this type of service not requiring a permanent local presence in a foreign market. Cole *et al.* (2007), in their study of insurance companies, try to prove the Eclectic Paradigm Theory for services. The results indicate that this paradigm provides a general framework for investigating the internationalization of services. Dicken (2003)^{xix} proposes the OLI advantages in order to understand the internationalization of business services, which suggests that the said tertiary activity will internationalize by FDI if it has competitive advantages over other companies with respect to assets and OLI competences.

Several authors have emphasized the important differences between firms of goods and of services, from which there were serious doubts regarding the applicability of the Eclectic Paradigm Theory. First, Rugman; Verbeke (2004, 403) accepted the limitation of the location of service firms with respect to manufacturing firms. Second, Abdelzaher (2012, 1725) raised doubts that, while the entry to the market of manufacturers can be driven by a combination of reasons (the pursuit of the market, the search for efficiency to access lower resource costs or the increase in the quest for strategic assets) (Dunning, 1988), the expansion of service companies is motivated primarily by the access of services to a bigger market and by following the customer (Li; Guisinger, 1992). Third, Bouquet *et al.*, (2004, 35-37) asserted that services rarely require large-scale investments in physical assets, such as equipment goods or manufacturing facilities. Therefore, the creation of asset value in a service firm relies more on human capital than on physical infrastructure (Erramilli; Rao, 1993; Campbell; Verbeke, 1994). Conversely, investments in services focus on training programs, expert visits, employment, etc. (Grosse, 1996, 796). Consequently, the distinct nature of services exerts tension on the choice of the mode of entry and the use of human capital. As well, given that for many services the production and consumption are inseparable, it is necessary to invest in human capital and take their own workers to local company in the destination country. Thus, these workers represent an effective strategy to help foreign affiliates to meet the objectives (Edstran; Galbraith, 1977; Kobrin, 1988; Mayrhofer; Brewster, 1996).

Tallman (1991) says that the eclectic model does not provide a unified perspective to explain and predict the choice of modes of entry. Thus, this does not explain why two service companies in the same line of business with similar OLI advantages, necessarily, do not choose the same entry mode. Li; Guisinger (1992, 677), starting from the following empirical research (Aharoni, 1966; Horst, 1972; Dunning, 1973; Root; Ahmad, 1978 and Davidson, 1980), introduce a set of characteristics that affect the international behaviour of services, such as the way to expand the FDI to services, the greater adaptability to the culture and language of service companies than manufacturers and, finally, the need for subsidiaries due to the simultaneity of production and consumption.

Dunning (1993) analyses changing the general paradigm, adapting it to the characteristics of services because of their intensity in FDI and the importance of cross-border alliances. To do this, he

establishes that the tertiary activity is less geographically concentrated than for goods, that services do not need to be global to be competitive (more goods have to be produced in order to reduce fixed costs and increase innovation to be more competitive), that investment in the tertiary sector is lower than in manufacturing, that services are more specialized than goods, that some of their activities precede the goods, which is why services increase in foreign subsidiaries and in the location of the sales generated, and that many services are employment intensive and not capital intensive. The research concludes that the Eclectic Paradigm Theory is an appropriate analytical framework for examining all types of multinational service companies and that the modifications or adaptations of the paradigm to services are a strategic response. In short, it adds a set of ownership advantages (consistency of quality, reputation, economies of scope, of scale, specialization, etc.), locational advantages (availability of services, research and development, job training, etc.) and internalization advantages (human element, information, tacit knowledge, etc.), which turn out to be essential factors in adapting said eclectic model to services.

On one hand, the empirical analysis of Bryson *et al.* (2004) should be highlighted, which develops new OLI advantages to apply them to services. First, the ownership advantages are based on the firm's reputation and knowledge of the workforce. Second, the locational advantages focus on the importance of the knowledge of local markets and providing face to face services to customers in that place. Third, the internalization advantages focus on the ability to exploit specific knowledge of the firm without the risk of giving that knowledge away to competitors. On the other hand, Ekeledo; Sivakumar (2004) conclude that the eclectic model ignores the characteristics of goods and services and, therefore, variables must be included that are based on the perspective of resources, such as the specific skills of the firm, the tacit knowledge, the experience of the firm, the specialization of services, firm size, organizational culture, firm reputation, resources and the complementary nature of the services. Finally, Faulconbridge; Beaverstock (2007) state that the OLI advantages can be improved by the internationalization of services, given that the firms of the tertiary sector internationalize not only to exploit advantages of ownership, location and internalization, but also to create spatial advantages.

In short, we believe that it is necessary to reflect on adapting the OLI advantages, generally, to the features of services. First, to inseparability given that, because of this feature, service companies will need to have their own personnel abroad. Therefore, FDI will be a perfect solution for many of them. Second, to heterogeneity, as two services are often not identical because if the delivery of the service involves various factors of interaction between the employees and their customers, they will need more knowledge concerning the factors of location than will manufacturers. Third, to non-permanence and inviolability, given that the reputation or brand image is necessary, since the quality of services is very difficult to prove. Therefore, we should think about the importance of including variables such as market knowledge, preferences and tastes of customers from the home destination, the learning of human capital and the organizational culture itself. Furthermore, the OLI advantages should be adapted to the special features of each type of service, which causes the eclectic model to be modified. For example, for an insurance firm it will be very important to include market knowledge as a locational advantage. However, for an ICT business it will be to exploit its advantages to avoid possible imitations.

Concerning knowledge-intensive services, Narula (2014) attempts to approach the changes in the international arena based on the general paradigm of Dunning. The research also highlights the duality between the co-evolution of the assets of the firm as a function of the factor endowments of the country, including knowledge-intensive services like those that are located in advanced economies. Therefore, it is worth mentioning that the locational advantages are not very relevant for KIS, as they usually have knowledge of the market and establish prior networks and partnerships in foreign markets. Therefore, KIS generally do not seek to be located in advanced countries for the factor endowments of the country, but rather for the pursuit of opportunities and following the customer. In particular, we believe it appropriate to make some modifications to the locational advantages proposed by Dunning (1997, 219)^{xx}, which are focused on (1) the search for natural resources (physical and human resources), (2) finding markets

(domestic market and access to regional markets), (3) the pursuit of efficiency, particularly in the rationalization of production to exploit economies of scale (specialization of products and processes), and (4) the search for strategic assets with a lead in the regional or global strategy (technology, organizational capabilities and markets). To do this, we believe that importance should be given, as factors of location, to the search for opportunities, following the customer, the establishment of networks and alliances and the previous experience of human capital. In addition, the co-evolution of the assets of KIS firms is often not based on the endowments of the country, but rather is a function of the feedback between human capital and the customer. In general, we think that in order for the Dunning paradigm to be able to adapt well to KIS, the importance of the perspective of the dynamic capabilities of the firm should be increased, which allows them to exploit their ownership advantages without the need to have locational advantages based on the factor endowments of the countries. Thus, the framework of globalization will depend, to a greater extent, on the internal capabilities of the firm, which would increase the information thereby reducing market uncertainty.

4. Conclusions

The Theoretical Contributions

This paper has tried to adapt some traditional theories of internationalization, mainly those based on market imperfections, such as the Theory of Industrial Organization, Transaction Cost Theory, Internalization Theory and the Eclectic Paradigm Theory, to services and, especially, to knowledge-intensive services, given that their features and their wide variety of activities make it necessary to differentiate them by sectors with their features and nature being the most common classification criteria for their applicability.

On the one hand, it can be seen from the analysis of the theoretical and empirical literature of cases of services and KIS, that the theory that best fits the behaviour that services and KIS often show in the modes of entry to the international markets is the Eclectic Paradigm Theory. Thus this was an attempt to avoid the shortcomings and lack of clarity of the Theory of Industrial Organization, Transaction Cost Theory and Internalization Theory on the internationalization of service companies, since, although in principle they help to explain their international behaviour in general, they subsequently turn out to be very static and need some development and modifications to be better suited to the conditions experienced by service firms. We also believe it appropriate to introduce a flexible nature, differentiation of services, intensity of human capital, continued investment in innovation or market factors in order for the Theory of Industrial Organization to be better tailored to the service sector and, for KIS, qualified human capital and the perspective of resources and capabilities. Furthermore, for Transaction Cost Theory and Internalization Theory to have greater adaptability, we propose that importance should be given to the external factors of the firm and, for KIS, knowledge, qualified human capital, the experience of the founder and networks or international alliances. In summary, we consider the theory that is best adapted to the service sector and to KIS, despite the modifications that have been raised in this work, is the Eclectic Paradigm Theory.

On the other hand, thought should be given to making modifications to Dunning's eclectic paradigm in order to tailor it better to the characteristics of services, especially KIS. Thus, in order that the general paradigm is applied well to services, the importance of human capital should be introduced as a proprietary advantage, as it is essential in the carrying out of their characteristics, allowing more flexibility in the face of the global dynamism. Particularly, the Eclectic Paradigm Theory needs more introductions and developments to properly adapt it to knowledge-intensive services than to the other service activities. We especially think it very relevant that, on one hand, the paradigm include the perspective based on the dynamic capabilities of the firm to promote the process of internationalization,

because they allow them to be more competitive in the international market and, on the other hand, the locational advantages should undergo a change of criteria, which focus more on the customer and on the search for opportunities than on the factor endowments in the country.

Future Research Suggestions

In accordance with the above, in future research we will try to empirically investigate the following proposals. First, if including the modified variables to better tailor the Theory of Industrial Organization and Transaction Cost Theory and Internalization Theory to the service sector, would improve the applicability of the Eclectic Paradigm Theory to said sector. Second, analyse whether including the importance of human capital and inseparability or not of services in the OLI advantages would better adapt said paradigm to services. Third, modify these OLI advantages to enhance their applicability to KIS, on the one hand, by introducing variables related to the dynamic capabilities of the firm and, on the other hand, by reorienting the locational advantages in the search for market opportunities and in following the customer. In short, it is proposed to empirically investigate whether, based on what we have been able to show through the theoretical and empirical literature of cases on some theories of internationalization, the development and modification of the proposed variables would improve the applicability of the Theory of Industrial Organization, Transaction Cost Theory, Internalization Theory and Eclectic Paradigm Theory to services and, especially, to KIS.

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ⁱ Teece *et al.* (1997, 516) define Dynamic Capabilities as “the firm’s ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments.”

ⁱⁱ Market orientation: KIS are characterized by being market-oriented because they provide personalized services with high added value to the customer (Werawardena *et al.*, 2007, 296). Being market-oriented implies knowing the needs of the customer, the influence of technology, competition and other environmental forces and acting with this knowledge in order to be competitive (Slater; Narver, 1995, 67). Therefore, it becomes essential for KIS to plan their relationships with customers and ensure excellent communication in order to increase the degree of adaptation of the service and the creation of added value (Amaro *et al.*, 2008, 1531).

ⁱⁱⁱ Location: KIS typically focus on areas where the majority of service providers are found (Bettiol *et al.*, 2013, 4). It is for this reason that, in some cases, they pursue strategies of following the customer in their internationalization. The main factors explaining the location of KIS is

the formation of knowledge, the innovative potential and the economic possibilities of agglomeration (Alcocer; Maroto Martin-Sanchez, 2010, 85). Thus, KIS focus on highly innovative environments, so that information and knowledge can spread efficiently in terms of population density levels, production and economic development.

^{iv} Employees: Employees of KIS firms are characterized by being highly qualified, by their training, professional experience and for their high degree of autonomy. The autonomy can include greater decentralization of decision making to employees and/or increased participation by them at the firm level (Von Nordenflycht, 2010, 155). The personnel of KIS firms employ specialized knowledge to solve customer problems (Lowendahl *et al.*, 2001, 915), as well as representing an intellectually qualified workforce (Von Nordenflycht, 2010, 159).

^v See Spender (1996), Petrash (1996), Holsapple & Singh (2001), Scarso & Bolisani (2010). As well, empirical studies dedicated to services (Erramilli, 1991; Mattsson, 2000; Lindsay *et al.*, 2003) and to KIS (Malkgård, 1998; Saarenketo *et al.*, 2004; Strambach, 2008; Scott-Kennel & von Batenburg, 2012; McQuillan *et al.*, 2013).

^{vi} See Barras (1990), Gallouj; Weinstein (1997), Windrum; García-Goñi (2008), Gallouj; Savona (2009), Maglio; Sphrer (2013). As well, the following studies decided to services and KIS: O'Farrell *et al.* (1998), Cavusgil *et al.* (2003), Dib *et al.* (2010) and O'Cass; Sock (2013).

^{vii} The ability of the firm to create networks is derived from Johanson; Mattson (1988). See the following empirical research: on services (Zain ; Ng, 2006), on software services, knowledge-intensive services and businesses and high-tech services (Bryson *et al.*, 1993; Moen *et al.*, 2004; Mort; Weerawardena, 2006; Strambach, 2008; and Scarso; Bolisani, 2011).

^{viii} Organizational learning is the process of the assimilation of new knowledge in the knowledge base of the organization (Autio *et al.*, 2000, 911).

^{ix} Based on the classification of Muñoz-Guarasa (1999, 56-67).

^x Taken from Martínez Mora (1997, 53-58).

^{xi} Taken from Martínez Mora (1997, 53-58).

^{xii} Taken from Breinlich; Criscuolo (2011).

^{xiii} Taken from Muñoz-Guarasa (2005, 593).

^{xiv} The Theory of Resources and Capacities proposed by Penrose (1959, 25) suggests that resources are fundamental for providing future services. According to Barney (1991, 105) three types of resources exist: physical, human and organisational. As well, they establish that in order to achieve a sustainable competitive advantage for resources, they must be valuable, rare and perfectly inimitable, having a low degree of substitutability. Thus, so that resources generate competitive capacity for the company, it is necessary to differentiate between resources and capacities.

^{xv} Taken from Ramón Rodríguez (2002, 132-133).

^{xvi} Taken from Lindsay *et al.* (2003).

^{xvii} Taken from Lindsay *et al.* (2003).

^{xviii} Taken from Muñoz-Guarasa (1999, 52-53).

^{xix} Taken from Faulconbridge; Beaverstock (2008, 7).

^{xx} Taken from Muñoz-Guarasa (2002, 173-174).

Current State and Perspectives of 3PL Outsourcing by SMEs

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Outsourcing knowledge intensive services is a solution for SMEs to reduce the competitiveness gap in relation with larger companies. However, the number of SMEs who resort to outsourcing of knowledge intensive services is still limited. In the present paper we explore SMEs understanding of logistic challenges and the determinants of their choices between integration and outsourcing of logistic processes, barriers which slow market expansion of 3PL services outsourcing by the SME sector.

1. Introduction

The present paper explores the desirability and feasibility of third party logistics (3PL) services outsourcing by SMEs in the Romanian context.

The interest for this issue came from a number of real life stories.

A micro-enterprise is a supplier of customised cardboard packaging and display stands. They are not a traditional manufacturer, but more an integrator, as they subcontract the majority of manufacturing activities, performing in-house mostly the design, and some finishing tasks. They perform a critical role within their informal network, as they get the contracts and take the responsibility for their execution. The owner of the company explains that they can compete with larger and better endowed companies only by flexibility. For instance, he says, nobody else will accept an order Friday to be fulfilled until Monday afternoon. About one third of the production is sold abroad. Under such circumstances he faces problems with the delivery. Once, they arranged transportation with an independent truck owner. The load was not secured as it should and the goods delivered were damaged during transportation, with multiple bad consequences for the firm.

Another case is that of a medium-size company distributing assembly elements for constructions, furniture manufacturing, DIY retail etc. They work with tens of thousands of individual items which are also grouped in various selling “units” or articles (box, blister, set etc.). They invest heavily in warehousing technology, including the acquisition of a warehouse management system (SAP). The implementing of the system took about five years, with assistance from a specialised consultant firm. The most challenging was to develop an internal competency related to the implementing and maintenance of the system. Now, when the system became operational, they take into consideration to extend services to other companies, either consultancy, or even warehousing related services, in order to better exploit the acquired competency.

Each case is particular, and the behaviour of each firm was dictated by individual sets of motivations. Nevertheless, both cases (along with several other similar ones)

raise a question about the state and the future of the 3PL market, from the SME sector perspective in particular. One may also have in mind an analogy with other outsourcing industries which appeared as practices of large corporations, but then expanded to the SME market, like accounting and IT services. Additionally, in the case of Romania, there is little information about the logistics services industry, so any investigation in this field will contribute to a better understanding of the situation.

We consider that it worth exploring the subject because, in contradiction with the very rich literature on logistics and supply chain management (SCM) on one side, and on SME logistics performance on another, the research regarding the outsourcing of logistic activities by SMEs is very scarce. There is little interest for the topic because for the moment it is a very rare practice but the situation will probably change in few years if we consider an analogy with other outsourcing industries which appeared as practices of large corporations, but then expanded to the SME market, like accounting, IT services or consulting. Additionally, in the case of Romania, there is little information about the logistics performance, so any investigation in this field will contribute to a better understanding of the situation.

The present paper starts by several theoretical considerations, and then we give an overview of the logistics industry in Romania. Next, we present the methodology and the results of a qualitative survey among Romanian SMEs about the way in which they are fulfilling their logistics activities and about their propensity to outsource some of these activities. Finally, we discuss the findings and suggest directions for further research.

2. Theoretical considerations

Introduced first in relation with military deployments, in the 19th century¹, logistics was defined as a “science” or an “art” of making resources (people, equipment and material) available in good conditions, at a certain (different) place and at a certain time, where and when they are required. It is concerned with ensuring performance of operations (efficacy, economicity and efficiency) and relies heavily on methods derived from the Management science (operations research).

Applied to business, logistics is commonly understood as a function of the enterprise, a set of interconnected activities leading to an intended result, a critical component of the ‘value creation chain’ (Porter, 1985) at the level of an enterprise, or “value creation system” when several enterprises contribute at creating a single end value added. Porter’s concept “value system” is now named supply chain.

Logistics and supply chain management enjoyed increasing interest from scholars, being considered as “an evolving, expanding academic discipline that does not appear to be approaching full maturity in the near term” (Maloni, Carter and Carr, 2009, 264; cited by Karatas-Cetin and Denktas-Sakar, 2013). These authors - last cited here - have indeed demonstrated the interdisciplinary character of logistics identifying

¹ Dictionary.com, “logistics,” in Online Etymology Dictionary. Source location: Douglas Harper, Historian. <http://dictionary.reference.com/browse/logistics>. Available: <http://dictionary.reference.com>.

17 disciplines and 18 theories which contributed at addressing logistics research questions during the last two decades.

However, it seems that nowadays developments in the field of logistics and supply chain management are led by industry professionals, organised within such bodies as the Council of Supply Chain Management Professionals (CSCMP), the European Logistics Association (ELA), or APICS –SCC. Such organizations have developed Dictionaries and Glossaries, benchmarking standards, reference frameworks and standards of professional competencies in the field.

CSCMP glossary defines logistics as:

“The process of planning, implementing, and controlling procedures for the efficient and effective transportation and storage of goods including services, and related information from the point of origin to the point of consumption for the purpose of conforming to customer requirements. This definition includes inbound, outbound, internal, and external movements” (CSCMP, 2013).

A more detailed understanding of the content of such process may be acquired from ELA Standards of Competence for logistics supervisors, mid-level and strategic level managers.

Within this professional milieu, with the increasing specialization, and outsourcing expansion, a new industry of logistics services is developing and new distinctions appear to be necessary. Third party logistics has appeared when logistics service providers undertook some of the tactical decision making tasks from their customers (choice of other service providers, coordination among different activities like warehousing, multimodal transportation) as well as the provision of some value adding activities. Then, the specialists providing the customer support in making strategic decisions regarding the design and setup of a supply chain framework received the name of Fourth-Party Logistics or Lead Logistics Partner (4PL or LLP). While it seems to be an agreement about the difference between 3PL and 4PL in the level (tactic vs. strategic) where the interaction with the customer occurs, there is a controversy about whether or not 4PLs may be concomitantly providers of asset dependent services (transportation, warehousing etc). In this respect, some argue that it might be a case of conflict of interest, and we tend to agree.

Anyhow, 3PL can be considered as an already established (sub)industry, while 4PL looks (at least in Romania) more like a desiderate. Not only many companies define themselves as being 3PL service providers, but also this segmentation is largely recognised in the academic literature. Alexandra Marasco has analysed and classified more than 150 scholarly articles on 3PL. She found a need for a more solid conceptual basis as “research relating to specific TPL issues has been conducted from various perspectives and is often based on different definitions or interpretations of what is meant by TPL”, which limits the possibilities for sharing and comparing research results. (Marasco, 2007, 142). Interestingly, Yang, finds a possible explanation for why the definition of third party logistics is still blurred: “From the provider's point of view, their business covers a great number of relationships involving everything from simple logistical activities to advanced logistical solutions; from the customer's point of view, the degree of outsourcing varies and the outsourced logistics activities differ greatly” (Yang, 2014, 18) The missing link unifying the provider and the customer perspectives is also emphasised by Soinio, Tanskanen and Finne (2012).

We agree with the fact that there is room for conceptual clarifications but addressing this issue falls outside the scope of our paper. Anyhow, from what we could see, practitioners do not have a concern about it.

For us it is important to note that the specialization has provided 3PL companies with the opportunity to develop superior competencies and to make use of sophisticated technologies which brings sizable efficiencies in the supply chain. Expanding the use of these capabilities to the entire economy will raise the overall economic performance. The problem is that a large part of the economy, consisting of SMEs, doesn't seem to be part of the game yet. Still, analogies with other outsourcing industries suggest that this will happen sooner or later. Here we share the views and concerns of Soinio, Tanskanen and Finne. They addressed the same kind of issues and they found that in Finland SMEs have little interest to none for improving logistics performance, either through outsourcing logistics activities or through other means. We also noted a useful elaboration of several service models, and the suggestion that SMEs may need strategic consultancy (4PL) in first place (Soinio, Tanskanen and Finne, 2014). On the other hand, in our opinion, the cited authors fail to consider a number of issues: the structure of the 3PL industry and possible market failures which may limit the providers' interest for the SME market, the state of the technologies and knowledge which may limit the capacity of service providers to meet the needs of SMEs, the interest of the consumer that may justify some kind of public policies supporting the overcoming of the said limits. By difference, we assume a perspective biased toward the public interest.

In Romania, apart from infrastructure, which ranks high in the public debate, the economic role of logistics and the state of the logistics industry is almost ignored by public policies. In other countries the interest is already manifested and raising (Rantasila and Ojala, 2013). At international level, the World Bank has developed a Logistic Performance Index (LPI). This study provides a clear support for making logistics a policy concern:

“Reductions in supply chain trade barriers improve the efficiency of the movement of goods, thus recovering resources otherwise wasted. By contrast, most tariff reductions reallocate resources, capturing only the more modest inefficiency created by the tax”. (World Bank, 2014)

3. The logistics industry in Romania

The most significant and reliable information on the state of logistics in Romania is provided by the World Bank LPI. The overall index is composed in six components

- The efficiency of customs and border clearance (“Customs”).
- The quality of trade and transport infrastructure (“Infrastructure”).
- The ease of arranging competitively priced shipments (“Ease of arranging shipments”).
- The competence and quality of logistics services—trucking, forwarding, and customs brokerage (“Quality of logistics services”).
- The ability to track and trace consignments (“Tracking and tracing”).
- The frequency with which shipments reach consignees within scheduled or expected delivery times (“Timeliness”).

The first three components measure inputs from policies and regulation and the last three the outcomes in terms of logistics performance (time, cost and reliability). Between 2010 and 2014 Romania has improved its relative position with 19 places in respect to the overall index and has made progress on almost all the dimensions. The fastest improvements, as well as the best relative ranks, were realized in terms of Timeliness and Tracking and tracing. It is obvious that the performance of the Romanian logistics industry surpassed the policy improvements.

Table 1. Evolution of Romania LPI ranks 2010 – 2014

	2010	2012	2014	+/-
Overall LPI	59	54	40	+ 19
Customs	85	61	59	+26
Infrastructure	99	87	64	+25
Ease of arranging shipments	34	53	36	-2
Quality of logistics services	66	64	43	+23
Tracking and tracing	66	53	34	+32
Timeliness	73	29	27	+46

Source: World Bank

Despite the overall positive evolution, Romania remains on the second lowest position among EU member states, being considered as a partial performer, a category of countries for which the World Bank report recommends addressing with priority the lagging behind in the fields of services reform, integration of border management, regional facilitation and corridors, transport infrastructure.

We could not identify any reasonably credible study regarding the logistic industry in Romania providing aggregate information at national level, apart from a recently announced research done by Ken Research. This one could not be consulted because of the prohibitive price. However, from the listing of the companies covered by this research we find that a large number of European major logistics firms have established subsidiaries in the country: GSK Europharm Distributie, Macromex, DB Schenker, H.Essers, HAVI, Dumagas, Tibbett Logistics, GEFCO, Dunca Expeditii, Kühne & Nagel, Aquila, Delamode, Gebrüder Weiss, DSV, OTZ, FM Romania, KLG, Cargo-Partner, Frigoexpres, Geodis Calberson. While by volume the transportation market is dominated by domestic companies, warehousing and third party logistics services are dominated by multinationals. It means that even if the Romanian logistics market is far from maturity, knowledge and experience from best performers are available.

The first international logistics companies came to Romania following their international customers, but during the last years, logistics companies are attracted in the country because of different reasons. Many come not only for the Romanian demand for services, but also to establish regional operations, taking into account the access to Constanta Port and to Danube, the relatively low price of real estate and the availability of well educated, foreign languages speaking personnel. Together with domestic companies which develop competencies in providing integrated services, the offer of 3PL services will increase and the need to address smaller size customers will become more pressing.

4. SMEs propensity to outsource 3PL services

We are looking to find out an indication about the presence of a latent demand for 3PL services among Romanian SMEs, as a recognized need for improving existent processes. We designed the investigation as an exploratory survey supported by an on-line questionnaire addressed to a convenience sample² of about 500 SME owners or managers from manufacturing and commerce sectors. We chose to keep the questionnaire simple in order to improve the answer rate. We also took into consideration that the subject or terminology may be unfamiliar for many respondents. In this respect we avoided to use terms and expressions like logistics, supply chain, or outsourcing. We did not neglected the possibility to encounter cases of on-going solution implementation, either in the form of investments in improving in-house capabilities, or in form of quest or even negotiations with external service providers. However, this last case – otherwise fruitful for market and transaction characterization - is considered to be outside the scope of the present paper. The questionnaire has been launched in March 2015 and until the end of June we got 114 valid answers. We consider that the answers' rate is very low, which given the circumstances, indicate – referring to the non-respondents - either a total lack of interest for the subject or a lack of readiness to address this kind of aspects (like "I am not prepared to answer these kind of questions yet").

The questionnaire is structured in several sections, each of them aiming to support collection of specific sets of information:

- Information on the type of business activity, allowing a categorization of respondents in line with suitable criteria;
- Information regarding problems faced in running the business, possibly generated by a dysfunctional logistics; these questions have an important role in the survey, not only because we expect a disclosure of a latent need for more advanced or better adapted logistics solutions, but also for their potential to raise the involvement of the respondent in relation with the aspects under investigation;

² The sample consisted of enterprise owners or managers that have already participated in a survey, who were personally invited to answer the new questionnaire.

- Information about the importance given by respondents to the different components of the logistics function in present, and about respondents' anticipations regarding a change in the future;
- Information about the extent to which respondents take into consideration as a possibility to outsource logistics services in present, in the near future or on longer run;
- Information about the using or intention to implement in future enterprise resource planning (ERP) systems

It is worth mentioning that the questions have been formulated in Romanian, in a somehow colloquial manner, using a terminology which is common in daily business activities, and avoiding the logistics specialised jargon. We made any effort to ensure the best semantic match, but fine differences cannot be entirely eliminated.

In addition to the general interpretation of the survey – which is further presented here – each respondents answers will be analysed in order to identify situations that can be latter analysed more in depth, through case studies.

The first set of questions aimed at segmenting respondents by type of business represented. Respondents were categorized following two sets of criteria: business model and degree of involvement in foreign trade³. The resulting categories and number of respondents in each category are presented in Table 2.

Table 2 The survey sample by category of enterprises

	High degree of foreign trade participation	Low degree of foreign trade participation	No participation to foreign trade	Total
Consumer goods manufacturer (CGM)	4	5	9	18
Make-to-Order intermediate goods manuf.(MTO)	2	2	9	13
Make-to-Stock Intermediate goods manuf.(MTS)	1	2	7	10
Consumer goods wholesaler (CGW)	3	8	13	24
Intermediate goods wholesaler (IGW)	4	4	3	11
Retailer (RET)			38	38
TOTAL	14	21	79	114

When deciding on the classification criteria we overlooked⁴ an important distinction discussed by Soinio, Taskanen and Finne. They remarked that SMEs affiliated to an existing supply chain managed elsewhere (usually by their powerful customers) have little room for logistics decisions (Soinio, Taskanen and Finne, 2012). We suspect

³ The questions were of type: "Which of the following describe best the activity of your company?"

⁴ We deliberately overlooked this aspect, in order to avoid excessive complication of the questionnaire and may be suspicion of respondents, potentially reducing the answering rate.

that many enterprises in our sample might be in such a situation, but we did not control this feature and this is a limitation for the present paper.

We must also mention that it would have been probably a better idea to consider separate questionnaires for manufacturing and commerce as in the current framework a series of particularities could not be clearly addressed.

The second set of questions was about problems faced by companies, possibly caused by logistics system dysfunctions, separately for inbound and outbound logistics. We listed 20 possible problems and asked respondents to estimate the impact on business operations (high, moderate, minor or none) of each, by combining frequency of occurrence with the gravity of consequences. The problems taken into consideration were referring to inadequacy of assets (insufficient warehouse area), administrative and information flow problems (errors), operational problems (mishandling, damage) and the consequences in terms of time, cost, overstock or stock-outs, demand or customer loss.

Almost all the respondents – exception being those representing retail companies – tended to give higher impact estimates to the problems related to the outbound logistics. Understandably, issues that can lead to customer dissatisfaction are a major concern for companies' leaders. In the case of retail companies, they are at the bottom of the logistics chain, they have little outbound logistics concerns, except when they also offer a home delivery service (some restaurants, supermarkets and durable goods retailers). Many "brick-and-mortar" retailers take orders by telephone or internet and organise the home delivery in house as a non-core activity which sub-optimal performance creates no concern. In contrast E-Commerce retailers outsource the outbound logistics to carrier companies. We could not identify any e-commerce company within our sample.

The highest bad impact score tended to be attributed to outbound inventory (overstock or stock outs), this time the sizeable difference being made by retailers and MTOs. Second, came administrative and information system shortcomings: slow processing, data missing, and errors. This finding should be noted, as this is exactly the area where the superior competency of 3PLs can make substantial difference.

The third set of questions addressed the perceived importance for the business of different logistics sub-functions or activities. The respondents were asked to make an opinion about the importance of each item (very important, important, not so important, not at all important) for the success of their company. They have been asked to consider the importance in present and in 5 years from now. The items displayed by the questionnaire are: planning, inventory management and control, warehouse management and operation, organizing transport, processing of orders and invoices, performance assessment and reporting. All the items were considered as important to very important, but the highest score was given to planning. We wouldn't guess this result, being the stereotype that practitioners are less sensitive to 'soft' inputs and more concerned about "hard results". In our opinion ranking planning high as importance comes partly from education, to some degree from the perceived need of information and mostly from the risk pressure. One should not forget that many of the respondents are enterprise owners. Probably, for them it is important to reduce at least the risk sentiment.

There are almost no variations between the importance attributed to each item in present and after five years. This can be verified not only by aggregated scores but

also for each respondent. We have already met during previous studies this incapacity to figure what changes will appear in the future. In general it is a symptom of the lack of strategic thinking. In this case we don't have elements in support of the same conclusion.

Fourth query is about the intention to outsource logistics services. In brief: "taking into consideration the problems related to logistics that affect your business, how likely is your company to ..." The respondents were asked to assess various scenarios with the following options: already done, in the pipeline, most likely in five years, in five years maybe, I don't know, probably not, absolutely not. The scenarios presented included:

- Acquisition of new assets (real estate, trucks etc.)
- Acquisition of IT (software, scanners, etc)
- Staff training (in logistics related matters)
- Hiring qualified personnel
- Contracting a master logistician (4PL)
- Outsource logistics activities with asset based service providers (3PL) including planning
- Outsource logistics activities with asset based service providers (3PL) excluding planning

The respondents were encouraged to leave aside the financial constraints and to presume that the cost associated with alternative choices is equivalent.

Overall, the companies in our sample display a preference for developing in-house competencies. Answers indicating likelihood of some measures in the near future were far more frequent in relation to in-house developments. The most popular scenarios are related to technology and knowledge acquisition. We could not see any relevant difference between categories of enterprises. On the other hand, the possibility of arrangements with 3PL or 4PL service providers is not excluded in an absolute manner; it is only treated as less likely by the large majority of respondents. Only 2 respondents representing CGM said they have outsourcing arrangements in the pipeline, while 21 respondents said that such arrangements is most likely to occur in five years. When it comes to likelihood of outsourcing, the majority of respondents (69) were undecided, choosing among the answers: "in five years maybe" and "I don't know".

The scenarios presented in the questionnaire are not mutually exclusive. One may take action to develop the company's asset and human related capabilities, and still consider the possibility to outsource the majority or the most critical logistics activities in five years. Yet, such behaviour has little sense.

In general, we guess that the attitude of respondents toward outsourcing is motivated by a combination of fear to lose control over the business and lack of information about the way in which outsourcing works.

The last query was about the IT capabilities in place. We received information, but finally we consider the result as being inconclusive. We do not have enough information to distinguish among in-house developed IT solutions, inexpensive-poorly adapted and poorly integrated solutions, or the degree to which companies owning sophisticated ERP solutions exploit the full potential of the technology. While IT talent

is not scarce in Romania, there is penury of sophisticated business knowledge, deep understanding and ability to use business phenomena modelling techniques.

5. Conclusions

The main conclusion of our study is that among Romanian SMEs there is awareness about the weaknesses of the logistics system and preoccupation for improving its performance. The perceived need for improvement act as a latent demand for solutions, but outsourcing activities toward external service providers is regarded with justifiable reserve, motivated by lack of information and fear to lose control over the business, in principal (adequacy of financial resources being let aside).

We have taken a non-conformist approach in designing the survey, and we believe that the solutions adopted in this case can be further refined and exploited for deepening the investigations.

Mass outsourcing of logistics services is considered to be a mark of a mature and sophisticated market. This is clearly not the case in Romania where the 3PL industry is in its nascent phase, characterized by lack of authentic rivalry among service providers, lack of transaction transparency, and deep information asymmetry between 3PL providers and their customers.

Our study support the conclusions from Finland of Soinio, Taskanen and Finne that perhaps, SMEs pass toward outsourcing 3PL should start with 4PL, as a source of more confidence and control over the subject. Additionally, if we accept a public interest in accelerating SMEs outsourcing of logistics activities, there a scope for public contribution to removing identified barriers. The priority should be to make available market information and industry benchmarking studies, and next, to disseminate success stories and best practices.

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Which Factors Influence Formalization in New Services Development Processes? Empirical Findings from European and Mexican Service Firms

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Current literature revealed that formalization in New Service Development (NSD) processes contribute significantly to the NSD success. If this is true, then why companies are not tending to implement formalized NSD processes? At the same time a review of the current literature shows that formalization in NSD processes are rare in most service firms. This study is aiming to investigate which factors influence the degree of formalization in NSD processes? A mail survey was conducted in seven European countries and in Mexico. In total 1333 companies participated in the study from a wide range of service industries. Multiple linear regression model was estimated and its assumptions were tested. The model predicted that explicit service strategy, type of service, type of innovation, and customer integration are positively influencing the degree of NSD process formalization.

1. Introduction

In increasingly dynamic competitive environments, cost, quality and technology leadership are no longer sufficient for service enterprises to secure crucial advantages. Instead, growing importance is nowadays attached to more subtle differentiations in the form of innovative services, which in many branches are rapidly developing into the unique selling propositions of each firm. The principal challenge facing companies is the need to offer the marketplace continuously improved, if not new, services, while keeping one step ahead of their competitors and at the same time fulfilling the needs and expectations of their customers.

Many service providers are however hindered by the fact that their present corporate structures and processes are not designed to enable services to be efficiently developed and launched on the market. Difficulties are frequently encountered because the new services created by firms are not clearly defined, there are no unequivocal descriptions of the service contents, the relevant processes, the customer interfaces and the necessary resources. As a result, efficient and successful implementation of these new services is considerably impeded by an absence of transparency as well as by interface and quality problems (Spath and Fähnrich, 2007).

Those companies that develop new services regularly are compelled to search for ways of avoiding the described difficulties, to prevent repetitions of past mistakes and to enable existing know-how to be reused. In order to accomplish this objective, they generally begin by describing their development processes and by standardising individual development steps to a certain degree. This *formalization* extends from predefined, rigid development process on the one hand to flexible, situation-specific procedures on the other. Where the term formalization is used in the following, it is thus in no way intended to imply that development processes are constrained inside an absolutely tight straitjacket. On the contrary, it means that these processes are no longer always arbitrary, but that there are defined guidelines according to which the services are supposed to be developed (Bullinger et al., 2003). In literature, the formalization of development processes is often seen as a success factor for new services (e.g. Meiren, 2006; Horne, 1993; Cooper and de Brentani, 1991), but there are as well research results claiming that formalization limits development speed and creativity and therefore could have a negative impact. Both positions have in common, that they refer on studies that are limited on low populations, on only a few industries and on generalizing research approaches. With the data of an extensive survey among service providers we now have the opportunity, to investigate formalization in new service development in detail.

2. Literature review and hypotheses

2.1. New service development strategy

“Service development strategy set goals, provide available resources and market window for which to aim” (Edvardsson et al., 2013). It is substantially revealed from the current literature that strategy is one of the key contributors to the success of new service projects (see, for instance, Gebauer et al., 2008; Jin et al., 2014; Posselt and Förstl, 2011). Particularly, Edvardsson et al. (2013), found that strategy contributes significantly to the NSD success and was the most influential factor. NPD literature shows that strategy is positively related to the new product development process. For example, Moore (1987), observed that most successful companies are more likely to tie new product development into their strategic plan. In the context of NSD, Fischer et al., argued that service innovation should be aligned with the service strategy, which should include determination of responsibilities within the innovation process, division of the innovation process into sub phases, contextual design of every step along the innovation process and customer integration into the individual steps of the innovation process. Moreover, Cooper and Brentani (1991) highlighted that strategic focus not only provides guidelines for resource allocation but also “*keeps a service firm from considering innovation as an ad hoc process*”. In addition, Horne’s (1993) study of 16 different US firms including consulting, information processing, retailing, financial services and hospitality suggests that some form of strategic planning exists for most service firms and the majority of successful firms shows great commitment to the strategic planning for new services development. Based on the above discussion we propose the following hypothesis.

H1: Service development strategy positively influence NSD process formalization

2.2. Customer integration into NSD

It is well established in the literature that customer integration in NSD is crucial and play an important role to develop services more successfully (see, e.g, Edvardsson et al., 2013; Polonsky et al., 2005; Posselt and Förstl, 2011; Tajeddini, 2011). Edvardsson et al. (2007), described customer knowledge as a key term in NSD and emphasized that new service development process and structure should be capable to accommodate different changing customer preferences. (Baron et al. 2009) argued that there is a need for NSD to be customer-intensive in order to integrate customer to a greater extent throughout the development process unlike traditional NSD process. Alam and Perry (2002), observed customers contribution in all phases of NSD process and at least one activity in every NSD step was performed. They proposed an NSD model which incorporates customer into various stages during the development process. This shows that customer’s integration is vital in NSD process and every step in the development process requires unique input from customers. This further suggests that new services development process should be more systematic and should include all important development stages in order to integrate customers in the NSD process to a larger extent. Besides the importance of customer integration, the method to integrate customers is of great concern. Edvardsson et al. (2007), explained that the extent and method of customer integration into NSD is dependent on the NSD type. Moreover, “In some cases it is enough to simply ask

customers what they want and then design and offer what they require. In many cases, however, customers have a hard-time verbalizing what they want in a way that gives sufficient information to direct the service development processes” (Edvardsson et al., 2007). The authors aimed for multi-method approach in order to fully understand customers. In their opinion simple surveys and verbal-based customer satisfaction studies are not sufficient. It leads us to our second hypothesis.

H2: Intensive customer integration has positive influence on NSD process formalization

2.3. Service typology

A review of the current literature suggests that heterogeneity in services influence the NSD process in particular formalization. For instance, financial services are developed more rigorously compared to other services. Crevani et al. (2009), observed that educational services are developed in more formalized way than logistic services and those companies have developed some standard modules for new service development. Recently, Meiren et al. (2015), derived a service typology which consists of four heterogeneous clusters of services. Namely knowledge-intensive, technology-intensive, routine-intensive and contact-intensive services. The results revealed that the degree of formalization in NSD process is different across these four groups. Knowledge intensity and technological intensity in services are significantly influencing the degree of formalization in NSD process positively. In other words, processes are more formalized for knowledge-intensive and technology-intensive services compared to contact-intensive and routine-intensive services. Examples of knowledge-intensive services are consulting, software development, medical, and coordination services. Technology-intensive services include engineering, IT, maintenance, repair, technical support, and energy management services. They argued that in these types of services technology complexity plays an important role and high risk in terms of cost and time convinces service companies to develop new services in more formalized way which include detailed principles.

H3: Type of service influence the degree of NSD process formalization

2.4. Types of innovations

For assessing the causes of success and failure it is crucial to consider the degree of innovativeness in a service because the level of uncertainty associated with new services is high compared to incremental services (Avlonitis et al., 2001). Available literature shows that classification of innovation varies across studies. For instance, Gallouj and Weinstein (1997) introduced six types of service innovations: 1) radical innovations, 2) incremental innovations, 3) improvement innovations, 4) combinatory innovations 5) formalization innovations, and 6) ad hoc innovations. However, Avlonitis et al. (2001) used a different classification: new to the market, new to the company service, new delivery process, service modification, services line extension, and service repositioning. Furthermore, Oke (2007), used three types of innovations: incremental innovation, me-too innovation, and radical innovations. Avlonitis et al. (2001) found that types of innovations have a relationship with the NSD process and different types of innovations require different development process. To investigate

these differences systematic behaviour, documentation and assignment of responsibilities were used in the study. Results revealed that systematic behaviour is correlated with “new to the company service”, and documentation is correlated with “service modification”. Furthermore, differences were also observed in the NSD stages across different types of innovation. For example, new to the market services have given strong consideration on idea generation and screening, business analysis and market strategy. Furthermore, moderate focus was given to the development and launch stages. Test phase however received little attention (Avlonnitis et al., 2001). Similar indication has given by Goudarzi and Alam (2011), in a comparative study of Indian and Australian financial sector. Australian firms considered most of the development stages during NSD projects especially more market test and service test were performed by Australian firms. It was argued that Australian firms develop more innovative services than Indians. Oke (2007) used “implementation” to assess the NSD activities across three types of service innovations (radical, me-too, and incremental). Implementation consists of multifunctional teams, formal procedures, and stage-gate systems. Findings revealed that implementation is only significantly correlated with radical innovation. Reasons were given that the development process is mostly built to poster radical innovation and incremental innovations are considered as a continuous improvement activity. Based on the above evidences we develop the following hypothesis and sub hypotheses.

H4: The degree of NSD process formalization is varying for different types of innovation in services

Furthermore, we assume the following hypotheses.

H4.a: New service offer does not has an influence on NSD process formalization

H4.b: New customer encounter interface has positive impact on NSD process formalization

H4.c: New operating structure does not have a relationship with NSD process formalization

H4.d: Service delivery processes have a positive correlation with NSD process formalization

H4.e: Adding new service attributes to the existing service offer does not have an influence on the NSD process formalization

H4.f: Developing new business models have an influence on NSD process formalization

H4.g: Service development process is positively influencing the NSD process formalization

2.5. Cross-functional teams

It is substantially revealed in the literature that cross-functional teams in NSD projects have yielded positive results (see for instance, Edvardsson et al., 2013; Polonsky et al., 2005; Froehle et al., 2000; Edvardsson et al., 2007; Gebauer et al., 2008; Posselt and Förstl, 2011). Edvardsson (2013), suggested that “An integrated

development team captures the skills and capabilities of the employees, and the team should be comprised of individuals representing a diverse set of skills". He argued that close and working cooperation between functions, professional groups and customers within firms are the key success factors to develop services successfully (Edvardsson et al., 2013). Furthermore, Johnes and Storey (1998) highlighted that teamwork in cross-functional fashion is extremely important throughout the entire development process. In organizational studies, rules and procedures have shown positive impact on cross-functional coordination. For instance, in the study of Reukert and Walker (1987), positive relationships were found between rules and procedures and perceived effectiveness of interdepartmental relations. Similar results were reported by Pinto et al., (1993) from the healthcare industry. Rules and procedures were described as "the degree to which activities or tasks on the project team were mandated or controlled". The study found that rules and procedures have a positive correlation with cross-functional teams. Furthermore, Crevani et al. (2009), observed that bureaucratic characteristics were assumed by some firms during the NSD process and it could harm innovativeness in many different ways. Among others, co-workers contributions to innovations initiatives will possibly be constrained and it will limit individual creativity. However, in those organizations where processes are formalized, he noticed that co-workers participation and commitment is of high interest for the management. The managers are however convinced for change and believe that innovation and improvement initiatives should happen in a bottom-up manner (Crevani et al., 2009). Based on the above studies and observations we propose our 5th hypothesis.

H5: Multidisciplinary team has a positive influence on the NSD process formalization

3. Research Methods

3.1. Data collection and sample

The data was collected in seven European countries (Germany, Switzerland, Austria, Italy, Sweden and Finland) and Mexico by a consortium (Fraunhofer Institute for Industrial Engineering, Hochschule Luzern, Service Research Center, Karlstad University, University of Turku, Campus 2 University of Applied Sciences, cfmt Milano, and Tecnológico de Monterrey, Mexico). In total 1333 companies participated in the survey. The data collection took place in 2014. The sample covers a wide range of service industries including finance and banking, health care, hotel, sport and amusement, retail, logistic, rental accommodation, construction, business and social services.

Table: 1 Sample characteristics

Country	No of responses	Percentage
Germany	186	14
Austria	72	5.4
Switzerland	202	15.2

Italy	211	15.8
Sweden	251	18.8
Finland	187	14
Mexico	224	16.8
N = 1,333		
Sector		
Industry	343	26.4
Service	957	73.6
Segments		
B2C	371	28.8
B2B	759	58.9
B2G	158	12.3
Employee		
20-99	614	46.1
100-249	280	21
250-999	270	20.3
1000+	169	12.7

3.2. Questionnaire

The questionnaire was developed based on both academic and practitioner-oriented literature review and discussions with experienced practitioners in the field of services. The questionnaire consists of several questions and constructs which covers different NSD aspects such as organization of NSD, customer integration, NSD process, NSD performance, and upcoming new trends in services. The questionnaire was developed in English, translated into five European languages (German, Italian, Swedish, Finnish and Spanish) and compared to check the meaning of each question in the above five languages. Mail surveys were carried out in each country. In addition to the mail survey, an online survey was launched in Germany by Heilbronn University and EvaSys tool was used. To assess the quality of the questionnaire a pre-test was performed with five companies. Most of the questions in each construct was measured on Likert scale from 1 to 10 (1: strongly disagree and 10: strongly agree).

4. Analysis

IBM SPSS (version 22) was used for statistical analysis. Specific questions were selected from the questionnaire for the repurpose of this study. Factor analysis was carried out to operationalize the construct of NSD process formalization. Principal component analysis was used as a method to extract components. Components were selected based on Eigen value criteria. In the construct of NSD process formalization only one factor had Eigen value greater than one. Varimax method was used for rotation. To measure the internal consistency of the construct Cronbach's Alpha was calculated ($\alpha = .87$). Kaiser-Meyer-Olkin Measure of sampling Adequacy test (KMO = .797) was carried out in order to assess the sample adequacy. For the types of innovations in NSD the whole construct was selected to assess the influence of each type of innovation on dependent variable (NSD process formalization). The construct consists of seven variables (new service offer, new customer encounter interface, new operating structure, service delivery process, adding attributes to the existing service, new business model, and service development process). Strategy and cross functional teams are dichotomous variables. Customer integration is a single variable measured on Likert scale from one to ten (to co-create value with customers we use methods beyond interviews and focus group). Factor and cluster analysis were carried out to derive the service typology variable from the construct of service types for the subsequent analysis. The cluster analysis yielded four different clusters of services: knowledge-intensive services, technology-intensive services, contact-intensive service and routine-intensive services. For hypotheses testing, a multiple linear regression model was estimated. NSD process formalization was used as a dependent variable. NSD strategy, cross-functional teams, customer integration, and types of innovations (new service offerings, new customer encounter interface, new operating structure, new service delivery process, adding service attributes, new business model, and new NSD process) were analysed as independent variables. The model R square is 25.2% and Adjusted R square is 24% which is adequate for this study. This shows that there is no irrelevant variables in the model. Variance inflation factor was used to detect the existence of multicollinearity. If VIF of a variable is below 10 then multicollinearity is not a problem (Myers, 1990). In our model no variable has VIF greater than 10. Regression standardized predicted value and residual were plotted to check if there is any sign of heteroscedasticity. The plotting shows no evidence of heteroscedasticity.

5. Results and discussion

5.1. Descriptive statistics

Descriptive analysis shows that 59.6% companies have explicit strategy for new services development and the rest don't have strategy for NSD. Regarding the organization of new service development, 67.8% companies use cross-functional project teams for new services development and 32.2% do not. Concerning special organizational units for NSD, 20.4% firms answered with "yes" and 79.6% with "no". Furthermore, 36.5% have other organizational units such as marketing department for NSD and 17% outsource NSD. These questions were asked as multiple choice questions. On average 7.03 new services development projects were conducted by the

respondents companies in the last three years. Of which only 4.81 were launched in the market and 4.17 survived the first year after launch.

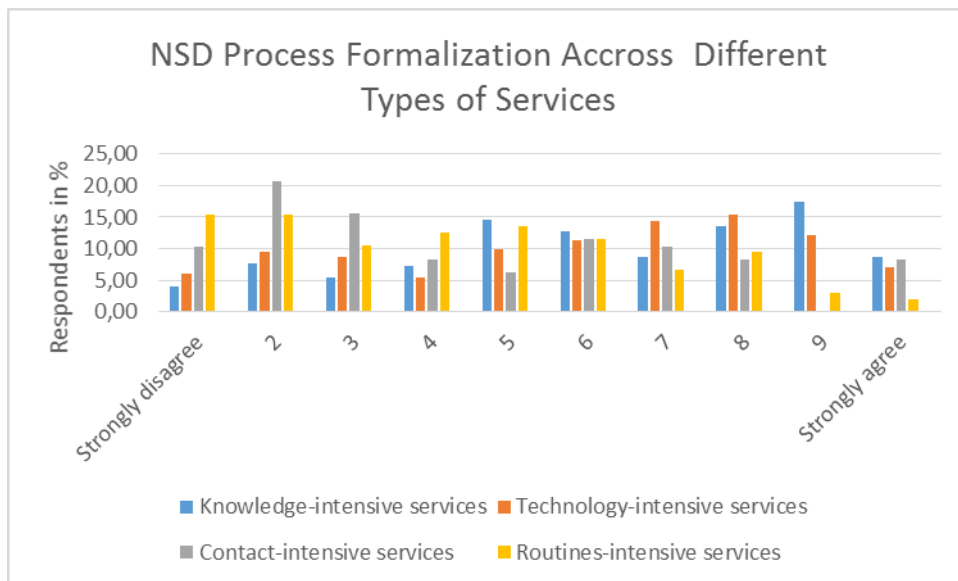


Figure 1: NSD process formalization and service typology

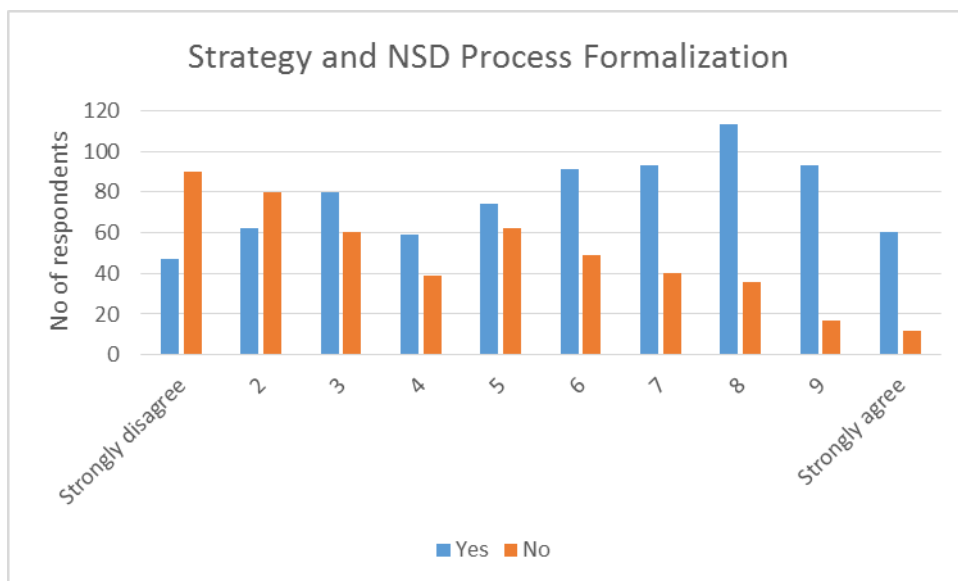


Figure 2: Strategy and NSD process formalization

5.2. Hypotheses testing

Results from the regression model (table 2) shows that new service development strategy is highly significant and positively influencing the degree of NSD process formalization. It gives us a clear indication that strategy play an important role to develop new services in a formalized fashion. This finding is also depicted from figure 2

and shows that those companies who have an explicit strategy for new service development, develop services in a formal manner compared to companies having no NSD strategy. Moreover, the model confirmed that formalization in NSD projects varies across different types of service innovations. NSD process formalization is positively influenced by new customer encounter interface, new service delivery process and new service development process for a new service. It means if a new service project involve the development of one of these types of innovations: new customer encounter interface, new service delivery process, and new service development process, requires high degree of formalization in NSD process. These results are somehow in line with the findings of Brentani (2001), that successful companies install a formal "stage gate" NSD system for the development of low innovative service projects. In case of new offerings alternative process and service patterns are mapped by these firms.

New service offer, new operating structure, and adding attributes to the existing service however is not statistically significant at all. Interestingly new service offer is not correlated with NSD process formalization. It could be explained by the fact that the development staff have limited knowledge and experience about the new service offer especially when a service is new to a company. Johnes and Storey (1998), pointed out that high quality and experienced development staff are required in order to develop new services through a formalized NSD program proactively and structurally. The model predicts that the type of service has a strong relationship with NSD process formalization. It means the degree of NSD process formalization varies among different types of services. The types of service were classified into four different clusters namely knowledge-intensive services, technology-intensive services, contact-intensive services, and routine-intensive services. Figure 1 provides a detailed picture and indicates that NSD process formalization is relatively high in knowledge-intensive and technology-intensive services. NSD process formalization has been discussed and investigated in several studies. However, the role of service typology was ignored during the assessment of the NSD process formalization. Most of the studies are carried out in the financial or other single specific service industry. Findings from multiple services sectors regarding NSD process formalization did not make typological distinction among services. For example, Crevani et al. (2009), claimed that process formalization is not that common during new services development. It was observed that only half of the interviewed companies could refer to an example of formalization in their companies during the NSD process. Similar results were revealed from a study by Kelly and Storey (2000), in various service industries in the UK. Furthermore, Chan et al. (1998), investigated innovation in retail/wholesale, financial services, hotel/restaurant, and tourism in Hong Kong, found that most of the service firms do not have proper system to control the NSD process even though they were engaged in some kind of innovation.

No significant relationship was found between cross-functional teams and NSD process formalization. The issue of formalization and innovation is still debatable in the literature. High degree of NSD process formalization may put constrain on innovation, especially when innovation initiatives coming from co-workers (Crevani et al., 2009). Customer integration by using methods beyond interviews and focus group is highly significant and has positive influence on the NSD process formalization. As noted by several authors that customer integration is of high importance in every phase of NSD processes. If only traditional method i.e. interviews and focus groups are practised, then value co-creation will be limited. Therefore, to integrate customer extensively, requires high degree of NSD process formalizations.

Table 2: Regression model

<i>No of variables</i>	<i>Independent Variables</i>	<i>Co-efficient</i>	<i>T value</i>	<i>P value</i>	<i>Hypotheses</i>
V1	Strategy	.421	5.899	.000	H1: Accepted
	Types of innovations				
V2_1	New service offer	.016	.854	n.s	H2a: Rejected
V2_2	New customer encounter interface	.030	2.038	.042	H2b: Accepted
V2_3	New operating structure	-.010	-.692	n.s	H2c: Rejected
V2_4	Service delivery process	.028	1.728	.084	H2d: Accepted
V2_5	Adding service attributes	.023	1.274	n.s	H2e: Rejected
V2_6	New business model	.003	.212	n.s	H2f: Rejected
V2_7	Service development process	.047	2.951	.003	H2g: Accepted
V3	New service typology	-.193	-6.034	.000	H3: Accepted
V4	Cross-functional project teams	.049	.716	n.s	H4: Rejected
V5	Customer integration	.065	5.146	.000	H5: Accepted

$R^2 = .203$ Adj $R^2 = .192$. F value = 18.082 ($p < .01$)

6. Conclusion

The aim of this paper was to investigate which factors influence the degree of formalization in new service development processes? Data from 1333 service companies was obtained in six European countries (Germany, Austria, Switzerland, Italy, Sweden, and Finland) and in Mexico from a wide range of service industries. A multiple linear regression model was analysed. The results revealed that NSD strategy, service typology, types of innovations, and customers integration beyond traditional

methods have positive impact on the degree of formalization in NSD process. Companies having explicit NSD strategy follow more formalized approaches in order to develop new services which leads to success. The degree of NSD process formalization varies across different types of services. This study revealed that knowledge-intensive and technology-intensive services demand high degree of formalization in the NSD process, compared to routine-intensive and contact-intensive services. Furthermore, NSD process formalization varies for different types of innovations. For instance, the results show that new service offer, new operating structure, adding attributes to the existing service, and the development of new business model are not correlated with NSD process formalization. On the contrary, new customers encounter interface, new delivery process and new service development process have positive impact on the degree of NSD process formalization. In addition, customer integration beyond interview and focus group play a crucial role in the context of process formalization.

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F: The role of services and service development in industrial policy

F1: Policy issues

Chair: Peter Smith

The impact of regulation of network and professional services on competition and trade

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Using data from Belgium over the period 1997-2005 and taking the perspective of the domestic policy maker, this paper looks at how regulation of network and professional services affects competition on the domestic market as well as imports and affiliates of foreign companies. The impact of regulation on the wider domestic economy is looked at first in terms of forward and backward linkages using input-output tables, second in terms of the impact of imports on manufacturing productivity and third that of foreign investment on productivity of the services themselves. Policy should look beyond the immediate impact of a regulation on the sector concerned to take into consideration the wider effects on the economy as a whole.

1. Introduction

There has been increasing interest in the way regulation affects key economic outcomes and in particular the way in which regulation can affect trade either internationally or within the European Single Market. However attempts to open up services to trade will likely fail if the domestic imperatives for regulation remain strong. In the first instance domestic regulation must be addressed through the interests of policy makers in the country concerned. In turn this warrants attention on the domestic effects of regulation, both on the services concerned and more widely on the rest of the economy through the linkages between regulated services and other sectors.

This paper therefore looks at the way in which regulation of certain types of services affects the domestic economy in terms of competition as well as trade. It looks first at the impact on network and professional services themselves. Then it looks at how these services impact the wider economy. The paper applies to Belgium over the period 1997 to 2005, a period when many regulatory changes were being made to this small open economy using micro data on more or less all enterprises in Belgium.

The paper innovates first in using micro data covering nearly all of the economy and not only large companies. Second it innovates in looking at forward linkages between these services and the rest of the economy and the impact on costs of user sectors both manufacturing and other service sectors. Third it extends the analysis to providers of services as a source of demand, particularly for manufacturing industry. Fourth it goes beyond intermediate inputs to look also at the effect of regulation on demand for machinery and equipment and other forms of capital investment.

2. Literature Review

Interest in opening up previously protected services to competition largely dates back to the 1980s, when such services as air transport and telecommunications began to be affected first in the United States and then in other English speaking and Nordic countries. The OECD has provided a significant boost to the study of the process of liberalisation of services through a series of product market indicators for services dating back to the late 1990s and sometimes earlier using a comparable methodology and applying to a large number of countries (Conway & Nicoletti, 2006; Koske; Wanner; Bitetti; Barbiero, 2015). The indicators have been criticised (Pelkmans, 2010) but they nevertheless constitute a very rich source of information. The possibility to use low level and intermediate levels of aggregation to verify the effect of different kinds of product market regulation on economic performance represents a key advantage of the OECD product market indicators for services and one that is exploited in this paper. A limitation acknowledged by the OECD is the fact that the indicators make no attempt to measure the stance of regulation with respect to public policy goals other than promoting competition. While this makes the process of constructing indicators less subjective, policy makers must always take into consideration the balance between efficiency gains from greater competition with the adequate protection of public policy goals. Enforcement is another important issue which the indicators have not been able to deal with satisfactorily.

A large number of macro-and micro-economic studies have applied the indicators to test the impact of regulation on a wide variety of different dimensions of economic performance including domestic and foreign direct investment, productivity, employment and wages, markups and firm entry rates. These studies use different techniques and types of data from economy wide to sectoral to micro data on individual enterprises. From the beginning a dual impact of services' regulation has been identified, that on the sector concerned and that on the rest of the economy, in particular manufacturing industry. These "knock on" effects depend on the extent of anti-competitive regulation in non-manufacturing sectors and the importance of services as suppliers of intermediate inputs. The importance of services as a source of demand for, often high technology, investment goods supplied by the manufacturing sector appears to have been largely overlooked, but an issue explored in this paper.

A number of studies look at the level of competition in services measured by markups or price cost margins. Høj et al. (2007), Bouis and Klein (2008) and Christopoulou and Vermeulen (2008) use sectoral level data. Nguyen-Hong (2000), Dihel and Shepherd (2007) and Bottini and Molná (2010) use individual company data. Christopoulou and Vermeulen and Bottini and Molná limit themselves to estimating markups, while Bouis and Klein further look at the effect of markups on productivity. Høj et al., Nguyen-Hong and Dihel and Shepherd all relate the degree of product market regulation to the level of competition, the latter two extending the analysis to the impact on trade by calculating tax equivalents.

These studies all find that the level of competition in services is generally lower than in manufacturing, but can differ on which services and which countries record the lowest levels of competition. The most recent study using micro data (Bottini; Molná, 2010) concluded that estimated markups were high for services where a high degree of information asymmetry prevails and products are customer specific, such as real estate, renting and utilities and professional services. Markups tend to be substantial-

ly lower for traded services and industries that produce more standardised products such as construction, computer services, distribution and catering.

In the light of the conclusion of the Uruguay Round when services entered for the first time the multi-lateral framework for trade and efforts to complete the EU's Single Market for services, the impact of domestic regulation became an important topic. Molinuevo and Sáez (2014) describe the different approaches to measuring the impact of regulation on trade along with an extensive discussion of the literature. They include measuring the impact of regulation on markups or price-cost margins discussed above and a number of indirect methods including gravity equations and CGE models. Less frequent are studies of the impact on (inward) FDI, which is a major lacunae since most trade in services takes place through permanent presence rather than through cross-border trade (Smith, 2015).

Three studies cover the interaction between manufacturing and services (Pilat; Wölfl, 2005; Faini; Haskel; Navaretti; Scarpa; Wey, 2006; ECSIP, 2014). Pilat et al show that the link can be measured in various ways. First the contribution of intermediate inputs and value added in the growth of gross output can be used to calculate rising dependency on bought in goods and services. Second occupational data can be used to show how service functions increase in manufacturing industry. Third input-output tables can be used to show how services are “embodied” directly and indirectly in manufacturing production. In the mid-1990s, the beginning of the period examined in this paper, services accounted directly or indirectly on average for about 22% of OECD manufacturing production. Backward linkages measure a sector's dependence on other sectors which supply it with intermediate products. However as mentioned some of the impact of greater demand for manufacturing occurs through demand for investment goods, which is included as a component of final demand in the input-output tables rather than intermediate consumption. Pilat et al do not mention the possibility of also measuring forward linkages using input-output tables. Forward linkages measure a sector's dependence upon other sectors as buyers of its output.

A study by Dietzenbacher (2002) addresses both of these issues by taking into account final output coefficients of consumption, exports and investment and by measuring both backward and forward linkages and then applying them to the case of an intercountry input-output table for six European Union countries. He found that the three smaller countries (Netherlands, Belgium and Denmark) have smaller backward and forward multipliers than the larger countries (Germany, France and Italy) indicating that their production processes depend more on external sources such as imports and exports and that small countries also have significantly larger import and export multipliers than large countries. Manufacturing sectors have larger backward output multipliers than services, larger import multipliers and larger intercountry spillover effects. For forward effects, the major distinction is between sectors that produce for final demand, which have small output multipliers, and those that produce for intermediate consumption which usually exhibit large output multipliers, among which are to be found services such as transport and communications.

As pointed out by Faini et al, aggregate productivity analyses exclude input-output linkages by definition while sectoral or firm-level analysis typically focus exclusively on variables that are related to the sector of interest. Both Faini et al and ECSIP look at the impact of services on growth in manufacturing productivity, with the first using OECD regulatory restrictiveness indices for network and professional services weighted by the direct and indirect contribution of these services to goods producing

industries, finding a negative effect of regulation on productivity. ECSIP looks at how domestic and foreign linkages affect manufacturing productivity growth and find that domestic linkages play the major role for large European countries and foreign linkages for the small ones like Belgium.

In addition to their work on manufacturing productivity, Faini et al also show that regulation of network and professional services negatively affects inward FDI in manufacturing industries that use these services heavily and because foreign affiliates have higher productivity than domestic firms this also affects negatively levels of productivity. Their work is in line with that of the OECD where Nicoletti et al. (2003) show that regulatory policies that restrict market access or reduce the potential returns to foreign investment negatively influence the share of foreign direct investment in OECD countries. Conway et al. (2006) regress the share of employment by foreign affiliates in total employment at the sectoral level on the regulation impact indicators and a number of control variables. They find that regulatory restrictions to domestic competition and FDI both have a significant negative effect on the employment share of foreign affiliates across model specifications.

Input-output models can be used alongside other models to assess the impact of a change in policy or the threat posed by an exogenous change in the economic environment on output, employment or other variables of interest. Studies by Susuki and Uchiyama (2010) and by Kerschner et al (2013) for example look at the impact of a rise in the price of oil on respectively the Japanese and US economies and identify vulnerable sectors based on the energy dependence and location within the production chain. Kveiborg et al. (2006) evaluated regional economic impacts from heavy vehicle fees comparing input-output based models with system dynamic and computable general equilibrium models (CGE). Input-output models do not often look at how demand side can react to changes in prices. Price increases will affect both intermediate and final demand leading to further declines in demand. CGE models are typically comparative static equilibrium models with substitution between inputs. They are capable of taking into consideration different types of interaction. However it is usually difficult to distinguish what is driving the results and because the adjustment path is instantaneous the time dimension is absent. System dynamic models can take into consideration different types of effect and are better able to take into consideration the dynamic aspect of a policy change but the models have not been very consistent.

Ogarenko and Hubacek (2013) made a study of the effect of eliminating energy subsidies in Ukraine that from a methodological point of view most resembles the approach adopted in this paper. First a price model is utilized to estimate price changes resulting from subsidy elimination and then a demand driven input-output model is adopted for estimation of associated changes of environmental and social variables. Their approach uses own price elasticities of demand to establish the link between price changes estimated by the price model with changes in final demand.

3. Methodology

Measurement of the effect of regulation proceeds in two stages. First the effect of regulation on competition and trade on enterprises in Belgium is measured econometrically. The econometric results are then used to evaluate the impact of such regulation on the wider economy, including the manufacturing sector.

3.1. The impact of regulation on competition and trade for individual enterprises

OECD sector specific regulatory indices are used to measure types of regulation separately for network industries and for professional services. The indices are constructed on the basis of very detailed questionnaires, the results of which are then weighted and combined into sub-indices and an aggregate index for each sector with values varying between 0 for no regulation and 6 for the most restrictive regulation (Conway; Nicoletti, 2006). From a policy point of view and also to avoid the need for weighting, the most detailed level of regulation proves the most useful. Rather than measuring whether regulation per se has an impact on a particular variable, it is much more interesting to be able to distinguish which particular type of regulation is affecting competition or alternatively trade. However, at a disaggregated level, indices for the same sector for the same country tend to be highly related and to pose a problem of multi-collinearity in the estimation procedure. Regulations that weigh heavily in the overall result will likely have a high explanatory power when taken individually, and a comparison between the adjusted r^2 s of the overall regression with those of regressions on the underlying individual regulations can help to identify which these are.

For network industries, the questions on entry relate to the legal conditions by which domestic or foreign suppliers may enter the market. Additional questions relevant to the particular market may be added to the basic questions on market access such as participation in open skies agreements, third party access to the grid, consumption thresholds to be able to choose a supplier. Because the underlying questions differ from one sector to another for network industries, only sub-indices can be used to compare the effects of entry regulation across sectors. The indicator on public ownership relates to the percentage share in the largest firm(s) in the sector and is highly comparable across the different network industries.

Since the underlying questionnaires for the four professional services are the same, comparability of the results can be assured. The indicators on entry concern the exclusive right to provide certain services (for instance to plead in court or to audit publicly quoted companies), educational and training requirements to be admitted to the profession and restrictions on the number of firms that may practise a profession. Indicators on conduct relate to the legal form that is permitted to practice, limitations on cooperation between professionals, price regulations and restrictions on the ability to advertise. It should be noted that in Belgium none of the professions had restrictions on the number of foreign professionals/ firms permitted to practice by quo-

tas or economic needs tests so that this type of regulation could not be tested. These restrictions would have needed to be abolished subsequently under the Services Directive, which applies also to professional services, had they existed.

The regulatory indices used for the estimation phrase are limited to the period 1996 to 2004 for network industries and to the years 1996 and 2003 for professional services owing to limitations in the availability of Belgian micro data (see section on data) and in the case of professional services to the collection periods for the OECD exercise. The OECD overall product market regulatory indicator for Belgium declined from 2.3 in 1998 to 1.64 in 2003 and then to 1.52 in 2008 and 1.39 in 2013. It can be of interest to see how regulation has developed since 2004 also for the network industries covered (electricity generation and distribution, postal and telecommunications services, air and rail transport) and professional services (lawyers, accountants, architects and engineers) (Table 1).

year	Electricity			Telecom			Post			Rail			Airlines		
	Overall	Entry	Public Ownership	Overall	Entry	Public Ownership	Overall	Entry	Public Ownership	Overall	Entry	Public Ownership	Overall	Entry Barriers	Public Ownership
1996	4.68	5.00	1.73	4.62	5.00	3.01	4.33	2.00	5.00	5.63	6.00	6.00	1.53	0.00	3.06
1997	4.68	5.00	1.73	4.35	5.00	3.11	4.33	2.00	5.00	5.63	6.00	6.00	1.53	0.00	3.06
1998	4.68	5.00	1.73	3.96	3.75	3.21	3.33	2.00	5.00	5.63	6.00	6.00	1.02	0.00	2.04
1999	4.67	5.00	1.68	2.39	1.50	3.21	3.00	1.00	5.00	5.63	6.00	6.00	1.02	0.00	2.04
2000	3.86	2.33	1.49	1.81	0.00	3.21	3.00	1.00	5.00	5.63	6.00	6.00	1.02	0.00	2.04
2001	3.85	2.33	1.44	1.70	0.00	3.21	3.00	1.00	5.00	5.63	6.00	6.00	0.00	0.00	0.00
2002	3.84	2.33	1.39	1.70	0.00	3.21	3.00	1.00	5.00	5.63	6.00	6.00	0.00	0.00	0.00
2003	3.82	2.33	1.34	1.69	0.00	3.21	3.00	1.00	5.00	5.63	6.00	6.00	0.00	0.00	0.00
2004	3.57	1.33	1.34	1.67	0.00	3.21	3.00	1.00	5.00	5.63	6.00	6.00	0.00	0.00	0.00
2005	3.57	1.33	1.34	1.66	0.00	3.21	2.67	1.00	5.00	4.88	6.00	6.00	0.00	0.00	0.00
2006	2.91	1.33	1.68	1.64	0.00	3.21	2.00	1.00	3.00	3.75	3.00	6.00	0.12	0.00	0.25
2007	2.17	1.00	1.68	1.62	0.00	3.21	2.00	1.00	3.00	3.75	3.00	6.00	0.12	0.00	0.25
2008	2.17	1.00	1.68	1.60	0.00	3.21	2.00	1.00	3.00	3.75	3.00	6.00	0.12	0.00	0.25
2009	2.17	1.00	1.68	1.59	0.00	3.21	2.00	1.00	3.00	3.75	3.00	6.00	0.12	0.00	0.25
2010	1.84	1.00	1.87	1.58	0.00	3.21	2.00	1.00	3.00	3.75	3.00	6.00	0.12	0.00	0.25
2011	1.84	1.00	1.87	1.58	0.00	3.21	1.67	0.00	3.00	3.75	3.00	6.00	0.12	0.00	0.25
2012	1.84	1.00	1.87	1.58	0.00	3.21	1.67	0.00	3.00	3.75	3.00	6.00	0.12	0.00	0.25
2013	1.84	1.00	1.87	1.57	0.00	3.21	1.67	0.00	3.00	3.75	3.00	6.00	0.12	0.00	0.25

Table 1a: OECD Regulatory Indices for Network Services

year	Accounting			Legal			Architect			Engineer		
	Overall	Entry	Conduct	Overall	Entry	Conduct	Overall	Entry	Conduct	Overall	Entry	Conduct
1996	3.79	4.08	3.50	3.75	4.13	3.38	2.54	2.83	2.25	0.00	0.00	0.00
2003	3.23	4.08	2.38	4.69	5.00	4.38	2.17	3.58	0.75	0.00	0.00	0.00
2008	3.23	4.08	2.38	4.31	5.00	3.63	2.35	3.21	1.50	0.00	0.00	0.00
2013	3.23	4.08	2.38	4.31	5.00	3.63	2.35	3.21	1.50	0.00	0.00	0.00

Table 1b: OECD Regulatory Indices for Professional Services

While the OECD regulatory indicators measure domestic regulation, the main impetus for liberalisation of network industries in Belgium has come from European Union legislation to open up such industries to competition in the context of completion of the Single Market for Services. The major legislation affecting professional services has been the Directive on Mutual Recognition of Qualifications, which has a much wider coverage than the four professions covered here.

Electricity and Telecommunications undertook the major process of market liberalisation during the period covered. Entry regulation diminished gradually for postal services before during and after the period covered while public ownership only began to fall from 2006. Entry for rail services remained heavily regulated until 2006 and public ownership remains high today, while entry barriers for airlines had already been eliminated prior to 1996. Public ownership of airlines fell markedly in 2001 with the bankruptcy of the national flag carrier SABENA. Therefore it is possible to exploit differences in changes over time as well as differences in the initial level of regulation between network sectors. For professional services there has been no clear pattern of liberalisation either during or after the period covered. The major difference con-

cerns regulation across sectors with accounting and legal services highly regulated, architects less regulated and engineers not regulated at all.

As indicated in the previous section, the OECD regulatory indices have been used in the past to measure tax equivalents for trade in services. The potential gains from trade are then assumed to flow from the total elimination of regulatory barriers. However, this approach inherently lacks realism. Services are regulated for a purpose and will continue to be regulated in future. Rather at issue is the form that regulation takes and whether regulation adequately meets the public interest that prompted the introduction of regulation in a way that minimises the adverse impact on competition and trade. For this reason it is more realistic to begin from the identification of those regulations that adversely affect competition and trade most severely and from there to try and devise alternatives that minimise these adverse effects.

This paper continues to use price-cost margins as a measure of competition on the domestic market. Price-cost margins have the advantage that data on an individual firm level can be calculated from balance sheet data while prices and quantities are not directly observable. Greater competition should lead to lower margins and ceteris paribus lower prices for users. A key assumption has been that the fall in price-cost margins from a one point decrease in regulation will lead to an equivalent fall in prices of the service in question. While questionable, it should be understood that the impact assessments are presented as an exercise in possible outcomes and that another price assumption can easily be substituted for the one employed here.

The basic regressions are a reduced form similar to that in Nihel and Shepherd (2007) using a pooled OLS with robust standard errors clustered on the firm for competition and cross-border trade and a logit regression for measuring the probability of permanent presence.

For competition:

$$(1) \quad \log(PCM_{ij}) = c + B[controls_{ij}] + X.TRI_j + \varepsilon_{ij}$$

where the price cost margin (PCM) for firm i in sector j is “explained” by a constant, a set of sector and firm level control variables, the regulatory indices $X.TRI$ and a white noise error term.

For cross-border trade:

$$(2) \quad \log(imports_{ij}) = c + B[controls_{ij}] + X.TRI_j + \varepsilon_{ij}$$

where imports are measured as the world wide imports of firm i for services j .

For permanent presence:

$$(3) \quad \log \frac{p_i}{1-p_i} = c + B[controls_{ij}] + X.TRI_j + \varepsilon_{ij}$$

where foreign affiliate takes a value of 1 if the firm i in sector j is the affiliate of a foreign company and 0 otherwise and $p_i = P\{y_i=1/x_i\}$ is the probability of observing outcome 1.

In the case of the regressions on price-cost margins and on imports of services, the log-linear form constitutes a semi-elasticity which implies that a coefficient β_j measures the proportionate change in the expected value of the dependent variable as the explanatory variable changes. In the case of competition, this can be seen as the proportionate change in price-cost margins, PCM_j , for each one unit change in regulation, $X.TRI_j$. This feature of the regressions proves very useful for subsequent work on the impact of changes in regulation on manufacturing and the rest of the economy and is preferred to the tax equivalents approach. Similarly, for cross-border trade the coefficient β_j provides an estimate of the proportionate change in imports of services for each one unit change in regulation. In the case of FDI which uses a logit form of regression the coefficient cannot be interpreted in this way.

While offering the virtue of simplicity, the reduced form regression must be subject to a number of caveats. As is standard in an OLS regression, problems of endogeneity and of omitted variable bias are to be expected. To control partially for endogeneity, the regulatory indicators are lagged one period with regard to the dependent variables. Control variables for both sectoral and firm specific characteristics pose a particular problem for regressions on price-cost margins because the denominator for the margins is turnover. A great many of the common standardised variables such as capital intensity or labour costs also use turnover as the denominator leading to the same variable on both sides of the regression. For that reason, control variables have been limited to the Herfindahl index to control for sector specific characteristics influencing competition and labour productivity to control for firm specific characteristics. Year dummies control for business cycle effects. First a regression is run using sectoral dummies in the place of the indices of regulation and then the same regression is run replacing the dummies with the regulation indices and the results compared in terms of their explanatory power. Indirectly, it is hypothesised that the regulatory indices represent the major influence on the observed differences in outcomes due to the different sectors.

Because service characteristics and regulation are related, observed differences in regulation could potentially be ascribed to inherent characteristics rather than regulation itself (Smith, 2014). To mitigate this source of error, services with similar inherent characteristics have been selected. Correlation coefficients for the different services have been calculated based on nine questions relating to physical and mental intangibility, five questions related to the search-experience-credence framework and one variable measuring whether cross-border trade takes place through the need for both the provider and the user to be physically present for a transaction to take place. The results are presented in Tables 2a and b.

	<i>Passenger transport by air</i>	<i>Freight transport by air</i>	<i>Postal services</i>	<i>Courier services</i>	<i>Telecommunications</i>	<i>Passenger on rail</i>	<i>Freight on rail</i>	<i>Electricity</i>
<i>Passenger transport by air</i>	1							
<i>Freight transport by air</i>	0.94	1						
<i>Postal services</i>	0.93	0.90	1					
<i>Courier services</i>	0.88	0.90	0.92	1				
<i>Telecommunications</i>	0.52	0.63	0.62	0.48	1			
<i>Passenger on rail</i>	0.92	0.90	0.86	0.93	0.36	1		
<i>Freight on rail</i>	0.89	0.90	0.90	0.97	0.41	0.94	1	
<i>Electricity</i>	0.25	0.44	0.37	0.30	0.76	0.09	0.23	1

Table 2a: Degree of Similarity in Service Characteristics between Network Services

	<i>Legal services</i>	<i>Accounting, auditing, book-keeping and tax consulting services</i>	<i>Architectural, engineering and other technical consultancy</i>
<i>Legal services</i>	1		
<i>Accounting, auditing, book-keeping and tax consulting services</i>	0.71	1	
<i>Architectural, engineering and other technical consultancy</i>	0.56	0.69	1

Table 2b: Degree of Similarity in Service Characteristics between Professional Services

Transport, postal and courier services share similar characteristics while telecommunications and electricity are more similar to each other than they are to other network services. Electricity in particular, which has highly intangible characteristics, displays least similarity with the other network services. Among professional services accounting services are most similar to both legal services and architectural and engineering services.

3.2. The impact of regulation of service industries on manufacturing and the economy

Backward and forward linkages in the economy form the basis for measuring the extent to which regulation of competition can affect the rest of the economy and in particular manufacturing. The coefficients on price-cost margins can be used to estimate the value of a reduction in price for user industries (forward linkages). It can be considered as a measure of improved competitiveness for the rest of the economy and therefore excludes the price effect on the own consumption of the regulated service itself. Backward linkages are estimated through the effect of the price reduction on demand for the service considered. The impact of regulation on trade is evaluated here in terms of the effect on the productivity of manufacturing industry in the case of imports of services or on productivity of the sector concerned in the case of foreign direct investment.

Since estimates for the effect of regulation on competition relate to Belgium, 2005 national input-output tables produced jointly by the Federal Planning Bureau and the National Bank of Belgium are the primary source for the impact assessment of domestic regulation on competition (Federal Planning Bureau, 2010; Eurostat, 2008). They are used to calculate forward and backward linkages of network and profes-

sional services. Understandably, domestic policy makers are most interested in the impact on the domestic economy rather than spillover effects on the rest of the EU or third countries. Coefficients for the domestic economy therefore are the basis for the impact assessment.

The basic approach to impact assessment using input-output tables is set out by Miller & Blair (2009) and the necessary matrix algebra summarised in the methodological appendix. A symmetric input-output table has the use for each product or sector as row while the column represents all the inputs that are required to produce a given output. The Leontief model is usually used to calculate the effects of a change in demand on upstream inputs (backward linkages). Here the quantities change but prices remain the same. In order to calculate the impact of a change in regulation on backward linkages a further assumption has to be made concerning the impact of a fall in prices on demand for the services in question. Estimating own price elasticities of demand represents a major undertaking in itself and existing studies have been used to derive a range of plausible elasticities to apply to final demand. For meta studies in which both an average and standard deviation of values are provided, the low and high elasticities have been calculated as plus or minus one standard deviation from the average. A list of the studies consulted is provided in Annexe 2. While there are a large number of studies on price elasticities for network industries, only one study has been found for professional services and that relates to the US, which may well not be representative of Belgium or the EU generally.

	Total demand elasticities		
	Low	Average	High
Electricity	-0.2	-0.4	-0.6
Telecommunications	-0.3	-0.5	-0.7
Postal	-0.3	-0.6	-0.9
Air Transport	-0.8	-1.3	-1.8
Postal + Telecommunications	-0.3	-0.5	-0.8
Professional Services	-0.4	-0.6	-0.8

Table 3: Own price elasticities for network and professional services

Since elasticities vary according to different types of product or according to different types of users, elasticities have to be weighted appropriately to arrive at an overall price elasticity of demand. The estimated impact on total initial demand (both final demand and demand for intermediate inputs) is then calculated as a combination of the own price elasticity and the fall in price for a one unit change in regulation estimated econometrically. The production of this additional demand in turn requires the production of more inputs to the sectors whose demand has increased. This indirect output is estimated using the input coefficients required for one unit of output of the service in question.

A particular problem arises with regard to the impact on purchases by network and professional services on machinery and equipment. These are treated as outputs of manufacturing industry to gross fixed capital formation and final demand rather than as sales to other sectors. For the total, including imports, the Belgian input-output tables provide an estimate for GFCF by ownership branch which enables an investment rate to be calculated, but there is no breakdown by type of investment. To arrive at a figure for the impact on manufacturing industry, the share of machinery and equipment in total GFCF by network and professional services is calculated.

It should be emphasised that the estimates are made for network and professional services as groups and are not valid for individual services since the econometric coefficients are for the groups of services. In order to avoid aggregation bias, forward and backward linkages for network services are estimated using the most detailed level of input-output tables available (60 by 60 products) and then aggregated into a group, rather than first aggregating the products. Professional services are all part of the group “other business services” and it is impossible to differentiate the coefficients of that group further so that it has been necessary to apply those coefficients to the share of professional services in the total output of that group (28%). Combined with the poor quality of price elasticity information all the linkage effects for professional services need to be treated with particular caution. With the exception of air transport, estimated own price elasticities of demand for these services are quite low and below unity, meaning that a fall in price does not lead to an equivalent increase in the volume of the service demanded.

Similar to the Leontief model for backward linkages, the Ghosh model can be used to calculate the effects of an increase in supply on the rest of the economy. Following Dietzenbacher (1997), the Ghosh model can be interpreted as a price model. The coefficients can then be viewed as the effect of a change in one euro in the costs of industry i on the total value of production with quantities unchanged.

A number of limitations to the approach should be pointed out. In reality, lower prices for network and professional services would result in consumption of more services per unit of output and more service intensive intermediate inputs, which in turn would increase prices. The input-output price model sets the upper margins to price changes which would eventually occur and thus it is suitable for short term impact rather than long term analysis and that the impacts of regulatory reform are estimated before the economy has adjusted for price changes assuming that there is no time for structural changes and substitution of labour and capital for bought in services as well as cross-substitution between services.

A different approach has been taken with regard to impact of trade, in particular of the effect of regulation on imports of the relevant services. While the econometric procedure for estimation is the same as for price-cost margins the coefficients are used to assess the impact of more imports on manufacturing productivity in line with the results of the recent study by ECSIP for the European Commission on the relation between industry and services in terms of productivity and value creation. Although covering a somewhat different list of services than this paper, that study found that for small open economies like Belgium only linkages for foreign services had a positive effect on manufacturing productivity. Their estimate of a significant and positive effect of 0.264 on labour productivity growth rates appears plausible and will be used here as a basis for the impact of lower regulation on imports of services. Surprisingly, the study did not find evidence of positive effects of foreign direct investment in business services on manufacturing productivity. Instead the impact of foreign direct investment on the productivity of firms in the sector will be examined.

Dependent variable: Labour productivity growth rates (VA-based)

	Membership status			Country size		Technology intensity		
	EU-27	EU-15	EU-12	Large	Small	Medium-high	Medium-low	Low tech
Initial VA-based LP	-0.038*** (-7.84)	-0.014* (-1.88)	-0.048*** (-4.91)	-0.028*** (-3.23)	-0.038*** (-6.42)	-0.049*** (-6.57)	-0.048*** (-4.76)	-0.020* (-1.92)
Business service linkages: domestic	-0.017 (-0.21)	0.007 (0.10)	0.279 (0.87)	0.240*** (2.93)	-0.211 (-1.14)	0.144 (1.58)	-0.280 (-1.23)	0.028 (0.22)
Business service linkages: foreign	0.274** (2.60)	0.281*** (2.87)	0.517** (2.13)	0.452 (1.28)	0.264** (2.11)	0.396*** (4.05)	-0.115 (-0.32)	0.086 (0.51)
Share high-skilled labour	0.042 (0.85)	-0.079 (-1.34)	0.214 (1.59)	0.026 (0.38)	0.032 (0.45)	-0.047 (-0.83)	0.057 (0.44)	0.099 (1.31)
Share low-skilled labour	-0.045** (-2.27)	-0.059** (-2.48)	-0.254*** (-2.74)	-0.038 (-1.10)	-0.035 (-1.32)	-0.058*** (-2.77)	-0.014 (-0.27)	-0.062** (-2.31)
Inward FDI intensity	0.010 (0.54)	-0.008 (-0.47)	-0.011 (-0.20)	0.066 (1.02)	0.010 (0.48)	0.019 (1.19)	0.010 (0.22)	-0.009 (-0.17)
R&D intensity	0.592*** (3.17)	0.385** (2.38)	2.066*** (3.04)	0.219 (0.95)	0.739*** (2.94)	0.327* (1.93)	2.046 (1.59)	-0.237 (-0.10)
Constant	0.156*** (8.36)	0.092** (2.54)	0.150*** (2.80)	0.064 (1.28)	0.171*** (6.88)	0.191*** (9.04)	0.237*** (4.30)	0.096*** (3.36)
No of observations	189	106	83	44	145	76	59	54
Adjusted R ²	0.371	0.201	0.431	0.582	0.281	0.579	0.375	0.226

Note: t-statistics in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

Source: ECSIP

Table 4: Impact of service linkages on manufacturing productivity

4. Data

Panel data on individual firms for the period 1997 to 2005 held by the National Bank of Belgium is drawn from different sets linked by the basic business repertoire. For this paper data on balance sheets, on cross-border trade in services and on inwards foreign direct investment has been used. From these different data sets the relevant variables identified in the previous section are extracted and combined. Firms are selected on the basis of their principal activity for the regressions on price-cost margins and foreign direct investment. Unlike goods, where imports are concentrated within either the manufacturing sector or the distribution sector, a wide variety of user sectors import services. For this reason, the impact of regulation is measured on all imports irrespective of whether the service itself is the importer in question.

All firms in Belgium with a limited liability legal form are obliged to file balance sheet data with the National Bank of Belgium (NBB). Most economically active firms in Belgium choose to incorporate in order to benefit from limited liability. The exception are some of the self-employed who may choose to incorporate or not. Balance sheet data served to calculate price-cost margins on an individual firm basis from accounting data and to select firms on the basis of their principle activity.

There are two major problems with the balance sheet data. Small firms are not required to file data on turnover in their balance sheets. In fact only 40% did so in 1997 declining to 25% in 2005. Since turnover is required as the denominator to calculate price-cost margins, it was imperative to solve this problem by combining data from the VAT authorities with that from the National Bank. In this way it was possible to achieve an overall coverage of turnover of 84.2% of all firms for which there is balance sheet data. These firms however represent 97.5% of value added, 98.4% of employees, 99.1% of imports of services, 98.7% of exports of services and all imports and exports of goods.

The second major problem encountered is that only employees are covered in the balance sheet data while 52% of all firms in the NBB balance sheet data had no employees, which falls to 48% if only those firms for which there is data on turnover are considered. On the one hand this makes the coverage of the data very interesting

because it covers service firms that are excluded in most data sets, including micro enterprises which are very common particularly in professional services. On the other hand the absence of any employment data for these firms makes any calculation of labour productivity problematic because we lack a suitable denominator. The work around employed following that of Eurostat (2010) is to make a statistical adjustment to the figures on paid employees by adding a constant representing unpaid employment of one. However very small enterprises may have more than one non-salaried worker and this biases the labour productivity upwards. For that reason a quadratic form of labour productivity has been added to the variables in order to control for possible non-linearities.

Another important issue concerns the coverage of the data on cross-border trade in services. Data on cross-border trade in services is collected by the National Bank of Belgium as part of the statistics on balance of payments but the level of detail is quite limited and this poses a problem of matching between the regulatory indices and the trade data. Imports of both electricity and rail transport are englobed within broader categories (other business services and land transport respectively) which means that the effect of regulation on trade cannot be isolated for these two network industries. For professional services the situation is equally problematic. One category englobes imports of legal services, accountancy with management consultancy. Another category englobes both architectural and engineering services. The solution adopted was to weight the regulatory indices by the share of each profession in value added for the relevant category, putting all the indicators for management consultancy at zero since this is essentially an unregulated profession.

Further difficulties have been encountered with the impact assessments of the second stage. As with imports, input-output tables for rail transport englobe also road transport, which is both a much bigger sector and one that sells mainly to other enterprises contrary to rail transport, which supplies predominantly individual consumers. Coefficients for land transport are unlikely therefore to be valid for rail transport alone and therefore rail transport has had to be excluded from evaluations of the impact on the rest of the economy. As indicated previously, the only way impact assessments can be made for professional services using input-output tables is to use the coefficients for other business services and apply them to the share of output of professional services. The investment rate for air transport in 2005 poses a particular problem. Prior to bankruptcy the national carrier made substantial investments in aircraft which were acquired by the successor airline, which made few further investments with the result that the observed investment rate in 2005 was particularly low at 1%. Instead an investment rate of 9% for air transport has been assumed in line with that for other transport services.

5. Results

5.1. The impact of regulation on service sectors

Regressions on price cost margins for network and professional services are presented in table 5. For both network and professional services, the coefficients for entry regulation are positive and significant implying that regulation acts to increase margins and depress competition on those markets. For network services the impact

of public ownership is both significant and negative while for professional services conduct regulation is both significant and positive, indicating a supplementary effect to entry regulation on competition. The regressions illustrate the value of more disaggregated measures of regulation, particularly for network services where only entry regulation is seen to depress competition.

When interpreting these results, the purpose of regulation needs to be borne in mind. For network regulation, where issues of security of supply and safety are important, it is not clear why entry regulation should be required. Public interest requirements can be met in other ways than limiting entry. For professional services the situation is not so clear cut. It is more difficult to regulate the service so that regulation of providers has been the preferred form of regulation to protect users. Regressions on individual types of regulation can help to clarify the issue.

Network Services						Professional Services					
Variable	B_NRI_1	B_NRI_2	B_NRI_3	B_NRI_4	B_NRI_5	Variable	B_NP_1	B_NP_2	B_NP_3	B_NP_4	B_NP_5
HHI	0.0002***	0	0	0.0001***	0.0001**	HHI	0	0.0002***	0.0001*	-0.0001	0.0002***
lp	0.0000**	0.0000***	0.0000***	0.0000***	0.0000***	lp	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***
lp2	-0.0000*	-0.0000***	-0.0000***	-0.0000***	-0.0000***	lp2	-0.0000***	-0.0000***	-0.0000***	-0.0000***	-0.0000***
telecommunic	-0.6210***					legal	0.2189***				
postal	-1.0022***					accounting	0.2627***				
air	-0.4027*					architects	0.0847*				
rail	-1.6500***										
YR98	0.0519	-0.0442	-0.0456	0.0298	0.0101						
YR99	0.1806**	0.1355*	0.1059	0.1388*	0.1396*						
YR00	0.1534*	0.0824	0.1049	0.0917	0.1547*						
YR01	0.1095	0.0231	0.0965	0.0339	0.1467						
YR02	0.2129**	0.0939	0.1599	0.0959	0.2066*						
YR03	0.2346**	0.0887	0.1574	0.1157	0.2218**						
YR04	0.2412**	0.072	0.1427	0.1161	0.2197**	YR04	-0.0037	0.0600***	0.0165	0.0151	0.0492*
YR05	0.2892**	0.0604	0.1432	0.1537*	0.2547**						
overall		0.0908*				overall		0.1165***			
entryreg			0.0909***		0.0657*	entryreg			0.0808***		0.0724***
public ownership				-0.1681***	-0.1471***	conduct				0.0652***	0.0368**
_cons	-2.2051***	-2.3334***	-2.3196***	-2.0729***	-2.2157***	_cons	-1.9979***	-2.1711***	-2.0773***	-1.9486***	-2.1610***
N	6248	6248	6248	6248	6248	N	18384	18384	18384	18384	18384
r2	0.0325	0.0178	0.0207	0.0261	0.0293	r2	0.0819	0.08	0.0797	0.0769	0.0803
ll	-1.01E+04	-1.01E+04	-1.01E+04	-1.01E+04	-1.01E+04	ll	-2.64E+04	-2.64E+04	-2.64E+04	-2.64E+04	-2.64E+04
legend: * p<.05; ** p<.01; *** p<.001						legend: * p<.05; ** p<.01; *** p<.001					
Tax Equivalents (%)											

indicated previously such restrictions do not apply in Belgium to the four professions considered here (although such restrictions do apply to pharmacies). Less justifiable also are restrictions to the possibility of offering services beyond those required to protect the public. In the case of Belgium, the coefficient on the exclusive right of a profession to provide a service is negative, not significant and the overall explanatory power low. Even if an individual coefficient that is not significant can become significant alongside other variables, the negative sign should indicate that this seemingly strong barrier to entry does not have the expected effect on competition. While therefore some entry barriers for professional services do restrict competition, public interest requirements are likely to maintain such barriers for the foreseeable future. This should be borne in mind when interpreting the results for the impact of entry barriers to professional services on the rest of the economy.

Even though regulation on conduct appears to increase price-cost margins less than entry regulation it is much more difficult to justify on public interest grounds. Since the explanatory power on restrictions on the legal form under which a business can operate (for instance partnerships) is high, this restriction would appear as a prime candidate for future action to increase competition for professional services.

Variable	B_NP_6	B_NP_7	B_NP_8	B_NP_9	B_NP_10	B_NP_11	B_NP_12	B_NP_13
HHI	-0.0003***	-0.0001	0.0001*	-0.0001*	-0.0002***	-0.0003***	-0.0001	0
lp	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***
lp2	-0.0000***	-0.0000***	-0.0000***	-0.0000***	-0.0000***	-0.0000***	-0.0000***	-0.0000***
YR04	-0.0572***	-0.028	0.0067	-0.0293*	-0.0463**	-0.0659***	0.0007	0.0340*
Exclusive right	-0.0012							
Duration education		0.0313***						
Compulsory practice			0.1004***					
Professional exams				0.1990***				
Legal form					0.1584***			
Price regulation						-0.0193*		
Regulation of advertising							0.0872***	
Forms of cooperation								0.1271***
_cons	-1.7313***	-1.8947***	-2.0656***	-1.9103***	-1.8709***	-1.7241***	-1.9032***	-1.9612***
N	18384	18384	18384	18384	18384	18384	18384	18384
r2	0.0751	0.0762	0.081	0.0817	0.081	0.0754	0.0756	0.0789
ll	-2.65E+04	-2.64E+04	-2.64E+04	-2.64E+04	-2.64E+04	-2.65E+04	-2.65E+04	-2.64E+04

legend: * p<.05; ** p<.01; *** p<.001

Table 6: Regressions on price-cost margins for individual forms of professional regulation

The coefficients for the impact of a one unit change in regulation on the value of imports are very high and often highly significant (Table 7). In the case of network services both entry and public ownership depress imports of these services highly significantly while for professional services it is only entry regulations that depress imports when both entry and conduct regulations are taken together. The rationale for restrictions on imports appear much weaker than for the regulation of domestic markets. It is not obvious for example why a profession that is regulated in a similar way to a similar level in another member state of the EU should be less proficient in providing a service than a domestic supplier. The highest explanatory power of the specific types of regulation for professional services taken individually are for duration of education and forms of cooperation. Duration of education and compulsory practice are in fact highly correlated and that between legal form and possibilities for

cooperation between professions is also quite high so that we have a similar pattern for the effects of individual regulations on imports as for competition. In itself this is an important finding since it shows that regulation can have multiple types of effect.

Network Services						Professional Services					
Variable	B_NRT_1	B_NRT_2	B_NRT_3	B_NRT_4	B_NRT_5	Variable	B_PT_1	B_PT_2	B_PT_3	B_PT_4	B_PT_5
HHI	0.0010***	0.0010***	0.0009***	0.0010***	0.0010***	HHI	0.0003***	0.0003***	0.0003***	0.0003***	0.0003***
lp	0	0	0	0	0	lp	0.0000*	0.0000*	0.0000*	0.0000*	0.0000*
lp2	0	0	0	0	0	lp2	0	0	0	-0.0000*	0
telecommunic	1.2272**					legal	0.5564**				
postal	-2.0441					accounting	1.2827***				
air						architects	0.7165***				
rail											
YR98	0.1211	0.0836	0.1399	0.1639	0.1684						
YR99	0.2073	-0.206	0.0494	0.0498	-0.0538						
YR00	0.3018*	-0.5197**	-0.2634	0.2205	-0.1873						
YR01	0.4465**	-0.5298**	-0.3991*	0.4001**	-0.2057						
YR02	0.6457***	-0.7050***	-0.2261	0.1582	-0.4107*						
YR03	0.8585***	-0.6031**	-0.0324	0.2413	-0.3243						
YR04	0.9167***	-0.5527**	0.0459	0.2886	-0.2758	YR04	-0.0064	-0.044	-0.0482	-0.0338	-0.0469
YR05	1.1175***	-0.3093	0.2562	0.5468***	-0.0191						
overall		-0.7432***				overall		-0.6437***			
entryreg			-0.4402***		-0.3063***	entryreg			-0.5311***		-0.4540**
public ownership				-0.5046***	-0.4522***	conduct				-0.7795***	-0.1209
_cons	9.4044***	11.7757***	10.4198***	11.1134***	11.6231***	_cons	10.8093***	11.6378***	11.5511***	11.7296***	11.5857***
N	6079	6079	6079	6079	6079	N	2730	2730	2730	2730	2730
r2	0.1421	0.2095	0.1564	0.1948	0.2086	r2	0.0271	0.0487	0.0488	0.0469	0.0489
ll	-1.48E+04	-1.45E+04	-1.47E+04	-1.46E+04	-1.45E+04	ll	-5.90E+03	-5.87E+03	-5.87E+03	-5.87E+03	-5.87E+03

legend: * p<.05; ** p<.01; *** p<.001

legend: * p<.05; ** p<.01; *** p<.001

Table 7: Regressions on imports of services

The situation with regard to the impact of regulation on inward direct investment is not so clear cut. On the one hand, the negative effect on imports may induce foreign suppliers to enter the market via permanent presence rather than through exporting to Belgium. On the other hand, entry regulations that apply to domestic firms will also apply to firms from other EU member countries under the principle of non-discrimination. They will therefore have to overcome similar types of barrier although if the foreign firms are better resourced they may be in a better position to do so. For network services, public ownership seems to be a greater barrier to inward FDI than entry regulations although the coefficient is no longer significant when taken together with entry regulation. In highly concentrated industries public ownership of the major player(s) affects the potential for entry through acquisition or the form by which entry takes place (joint venture between Vodafone and Belgian Telecoms for mobile telephony as opposed to local subsidiary).

For professional services, it is only entry regulation that appears to depress inward FDI. These results need to be interpreted with great caution. There are very few legal and accounting affiliates of foreign firms established in Belgium in the FDI data and none for architects. Essentially the comparison made in the regression on FDI for professionals is between unregulated engineering services and regulated professions. This may be because the legal form for other professions are often partnerships and sole practitioners, which after establishment may be treated as domestic firms or too small to be reported under the surveys for foreign direct investment. However when it is the professional association itself that assesses the equivalence

of foreign diplomas under the European Professional Qualification Directives as appears to be the case for architects, this can lead to protectionist outcomes unfavourable to local establishment by suitably qualified professionals.

Network Services						Professional Services					
Variable	B_NRT_1	B_NRT_2	B_NRT_3	B_NRT_4	B_NRT_5	Variable	B_PT_1	B_PT_2	B_PT_3	B_PT_4	B_PT_5
HHI	-0.0002*	-0.0006**	-0.0004*	-0.0001	-0.0002	HHI	0.0022	0.0043**	0.0019	0.0084**	0.0041***
lp	0	0	0	0	0	lp	0	0	0	0	0
lp2	0	0	0	0	0	lp2	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***
telecommunic	-2.0394**					legal	-0.0563				
postal	-2.2697**					accounting	-3.2160*				
air	-2.2516					architects	(omitted)				
rail											
YR98	-0.0402	-0.1419	-0.1831	0.0467	-0.0274						
YR99	-0.282	-0.2051	-0.1619	-0.2996*	-0.0341						
YR00	-0.8710***	-0.2964	-0.2336	-0.8241***	-0.1585						
YR01	-0.7369**	0.2418	0.6635	-0.7200***	0.6431						
YR02	-0.6730**	0.3021	0.6655	-0.8946*	0.5513						
YR03	-0.7219**	0.2515	0.6376	-0.8744*	0.5339						
YR04	-1.2771***	-0.3391	0.0517	-1.4176**	-0.0077	YR04	0.4554	1.5904*	0.3325	3.3494	0.9655
YR05	-1.6012***	-0.6855	-0.2795	-1.6915**	-0.2182						
overall		0.8324				overall		-0.4015			
entryreg			0.5357		0.4607	entryreg			-0.6612***		-1.1912**
public ownership				-0.4459**	-0.3601	conduct				0.1728	0.8969
_cons	-0.1096	-3.6537*	-2.8934**	-0.8848	-2.5360*	_cons	-5.7183***	-7.3568***	-5.4435***	-10.6709***	-7.2897***
N	10333	10333	10333	10333	10333	N	18145	18145	18145	18145	18145
r2						r2					
ll	-1.50E+03	-1.52E+03	-1.55E+03	-1.61E+03	-1.53E+03	ll	-439.4623	-451.7641	-445.9601	-452.8989	-438.3604

legend: * p<.05; ** p<.01; *** p<.001

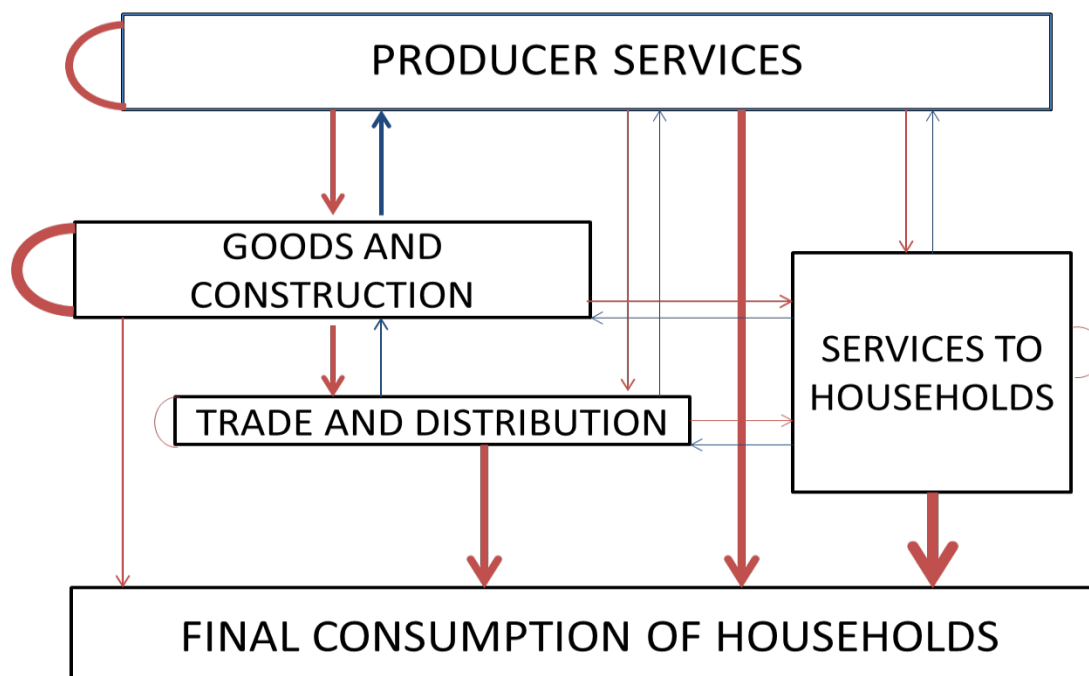
Table 8: Regressions on inward foreign direct investment

5.2. The impact of regulation of services on manufacturing and the rest of the economy

Linkages between the major sectors of the economy are illustrated in Fig.1 adapted from the Eurostat EU-27 input-output tables for 2007. The area of the rectangles is proportionate to the share of the sector in total value added. The value of sales to or purchases from each sector is proportionate to the width of the arrows: forward linkages are in red and backward linkages in blue. Producer services use their own primary inputs (labour and capital) to provide services to the rest of the economy. Their linkages are mainly forward but they also have sizable purchases from the goods producing sectors as well as very sizable sales among producer services. Goods producing sectors (including agriculture, mining and construction) act to transform brought in goods and services and then to sell them on to other sectors, thus exhibiting both very strong forward and backward linkages. The trade and distribution sector acts as a conduit for enabling goods and some service producing sectors to reach the final consumer and is characterised by strong forward linkages. Services to households use their own primary inputs to provide services to the final consumer and unlike the other three major sectors are very little integrated with the rest of the economy. Services therefore are situated either at the beginning of the flow of goods and services through the economy or at the end with goods producing sectors in the middle.

Fig. 1:

The Flow of Goods and Services through the Economy



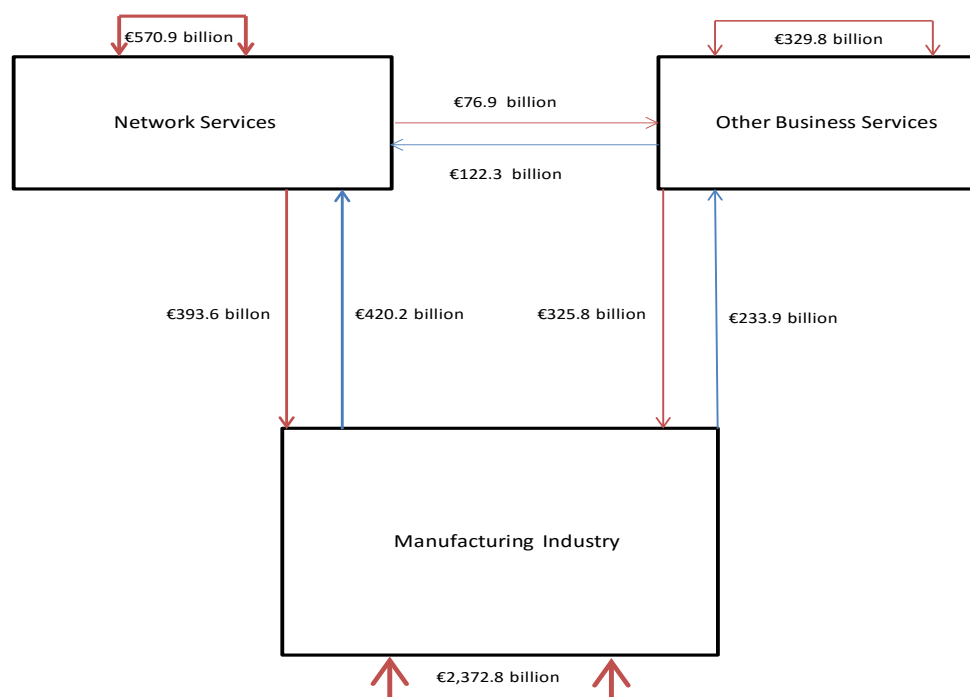
Source: Eurostat 2007 input-output tables EU-27

Within this general schema, this paper looks more particularly at the relationship between certain types of producer service (network services and other business services) and manufacturing industry. Network services cover energy, transport and post and telecommunications. Other business services comprise professional services and administrative and support services. The EU combined value added of network and other business services in 2007 was of a comparable size to manufacturing industry (€2 trillion against €1.9 trillion). Services for which econometric estimation was conducted comprise 59% of production of network services and 36% of other business services in the EU. The equivalent figures for Belgium are 57% and 28%.

Figure 2 examines these relationships for the EU in more detail. Of note are the very large intra-group exchanges, particularly for manufacturing (€2.4 trillion). Rather balanced flows characterise sales to and purchases from network services, business services and manufacturing. Sales of network and other business services constitute essentially intermediate consumption of user industries but purchases can be composed either of intermediate consumption or of machinery and equipment in the form of gross fixed capital formation by these services. An estimated 54% of manufacturing sales to network services and 60% of sales to other business services are constituted by sales of transport and other machinery and equipment, often with a high technological content. By contrast, these purchases are estimated to make up only 8% of purchases by manufacturing industry from itself essentially because of very large purchases of intermediate inputs within manufacturing industry. Measurement of intangible investments in gross fixed capital formation continues to lag that of

goods so that it is difficult to distinguish from these figures the important role of business services as a leading supplier of such investments.

Fig. 2: Network services, business services and manufacturing industry: flows within and between sectors



Source: Eurostat 2007 input-output tables and own calculations

Applying the methodology outlined in section 3.2, the effect of a 6.57% reduction in price of selected network services from a one unit reduction in entry regulation on the rest of the economy via forward linkages can be estimated in 2005 for Belgium as a cost reduction of 1,311 million euros of which 359 million euros for manufacturing industry and 952 million for all other sectors of the economy apart from network services themselves. For professional services a price reduction of 7.24% as a result of entry barriers could be estimated as a cost saving of 1,314 million euros of which 342 for manufacturing industry and 972 for all other sectors of the economy apart from professional services themselves. For the reasons indicated previously, it is probably not reasonable to expect that such a reduction would in fact be achieved. A reduction of 3.68% as a result of a one point reduction in conduct regulation appears more realistic. This can be estimated as equivalent to a cost reduction of 668 million euros of which 174 million for manufacturing industry and 494 million for all other sectors of the economy. Likely gains from reducing entry regulation of selected network services would therefore be roughly double those from reducing conduct regulation of professional services. These estimates represent the possible impact on the competitiveness of user sectors from regulatory reform.

Applying an estimate of the own price elasticities on overall demand to the projected fall in price from a one unit change in regulation of network services generates a total increase in output of 768 million euros under the low elasticity assumption, 1,378 million under the average assumption and 2,005 million under the high assumption. 68% of this increase can be attributed directly to the increase in demand for network services and the rest, between 247 and 632 million euros, indirectly from the additional output required to meet that demand from sectors that supply intermediate in-

puts to network services (backward linkages). The equivalent figures for professional services from the reduction of entry regulation would be respectively 642 million, 962 million and 1,283 million, of which 78% from professional services themselves and between 143 and 285 million euros from additional output in supplier sectors. More realistically, those for a one unit reduction in conduct regulation would be 326 million, 489 million and 652 million euros (between 72 and 145 million in supplier sectors). The impact on total output for a reduction of entry regulation for network industries is therefore estimated to be between 2.4 and 3.1 times that of a reduction of conduct regulation for professional services. Since network services depend more on inputs from other sectors than professional services, the relative impact on the output of other sectors from a reduction of regulation in network services is greater at between 3.4 and 4.4 times that of a reduction of conduct regulation for professional services.

In view of the strong links between producer services and manufacturing industry for often industry specific capital equipment, it can be interesting to evaluate the impact of an increase in demand as a result of lower regulation also on gross fixed capital formation and in particular that of purchases of machinery and equipment in addition to the impact on intermediate consumption. Again, increases in both of these items can be attributed directly by increased demand in the services for which prices are reduced or indirectly through increased demand in the industries serving the services in question.

By applying an overall investment rate in the sector in question to the estimate of increased output for that sector from the reduction in price of network or professional services, an estimate of increased gross fixed capital formation can be derived. Taking the share of machinery in equipment in total gross fixed capital formation, a further estimate of the impact on manufacturing industry can be made (most of the rest of GFCF is in construction and public works). In this way a reduction of entry regulation for network industries can be estimated according to the demand elasticity chosen as producing an increase of 77 million, 138 million or 201 million euros in gross fixed capital formation of which around two thirds by the network services themselves and the rest from increased demand in sectors supplying inputs. Of these respectively 38 million, 71 million and 105 million euros are expected to go to the manufacturing sector in the form of increased demand for machinery and equipment, three quarters of which by the network industries themselves. It should be noted that unlike the other figures quoted, this increased demand can be supplied either by domestic or by foreign firms in the form of imports.

Similar estimations can be made for professional services bearing in mind that both their overall investment rate and the share of machinery are lower than for network services. Taking also the lower estimate for the impact of conduct rather than entry regulation, professional services are estimated to contribute respectively 24 million, 37 million and 49 million additional demand for gross fixed capital formation under the different elasticity assumptions, 60% in professional services and the rest in supplier sectors. Respectively 13 million, 19 million and 25 million euros are for equipment and machinery of which 64% would be in professional services.

Bearing in mind that in 2005 Belgian gross output totalled 629,713 million euros, the figures quoted above may seem small (less than 1% of total gross output) but they are not insignificant in absolute terms. They are based on the hypothesis of a one unit decrease in regulation and more extensive market liberalisation can then be expected to produce greater benefits. The effect of a price reduction with unchanged

technical coefficients can be considered as a short term indicator of improvements in cost competitiveness of users. The impact on demand would be of a longer term nature. Measuring adjustments in terms of relative labour and capital inputs and of technical coefficients require the use of CGE models and are beyond the scope of this paper. They have been used extensively for example in ex ante and ex post evaluations of the effect of European integration but have been shown to be widely implausible in their results. The advantage of the procedure employed here is that it can be related directly to actual flows of goods and services in the economy and identifies different ways in which a change in regulation can affect the economy. The extent of linkages within the economy, the share of a sector in gross output, own price elasticities of demand and the semi-elasticity of a change in regulation on price are the four elements that together condition potential effects on the economy.

A different type of impact can be expected in terms of how imports of services affect the economy. Traditionally impacts in terms of greater competition for domestic suppliers as well as more choice for users have been highlighted as gains from trade. Here the impact on manufacturing productivity of more imports have been looked at more narrowly. The 0.264 coefficient for the effect of foreign business service linkage on labour productivity for small countries from the ECSIP study for the European Commission is quite high. In line with the conservative estimates made for the impact of greater competition, a lower coefficient of 0.200 would probably be more appropriate. Combined with a semi-elasticity of -.306 for entry regulation for network services and an even higher -0.452 for public ownership a combined effect of 0.15% on the growth rate of labour productivity in manufacturing from a one point decrease in regulation of selected network services should probably be taken as an upper bound. Professional services represent only 2% of imports of business services in the study and it is not considered realistic here to make an estimate of the effect of an increase in imports on manufacturing productivity.

The impact of greater access for foreign firms on the domestic market is expected to result first of all in an increase in labour productivity since the affiliates of foreign firms may displace or take over domestic firms rather than adding to competition on the domestic market (Smith, 2015). With the significant exception of electricity foreign firms have higher labour productivity than domestic firms (Table 9; numbers of observations in brackets). The difference can be substantial in other network industries than electricity or negligible in the case of legal and accountancy services. There are no foreign affiliates in the data for rail transport or architectural services so it is not possible to compare productivities for these services. The high domestic labour productivity for electricity can stem from a combination of high capital intensity and a dominant supplier in the period under consideration (even though Electrabel was already majority controlled by Suez during this period and presumably should have been classified as an affiliate of a foreign company). It should be mentioned that there are very few affiliates of foreign firms among legal services (9) or accountancy firms (3). Limitations on the legal form under which professional firms can operate alongside limitations on several professions operating together may be particularly burdensome for foreign firms.

Network	Overall	Electricity	Air Transport	Postal & Courier Services	Telecommunications
<i>domestic firms</i>	115832 (10119)	474135 (761)	61038 (1626)	40336 (3585)	140018 (3993)
<i>affiliates of foreign firms</i>	145102 (414)	175539 (188)	87950 (45)	47599 (52)	159986 (129)
<i>Affiliates as % Domestic</i>	125	37	144	118	114

Professional Services	Overall	Legal Services	Accountancy Services	Engineering Services
<i>domestic firms</i>	55086 (18089)	83603 (1367)	46602 (11465)	66174 (5257)
<i>affiliates of foreign firms</i>	75960 (88)	86193 (9)	47864 (3)	75857 (76)
<i>Affiliates as % Domestic</i>	138	103	103	115

Table 9: Labour Productivity in Network and Professional Services, 2005

6. Policy Implications

The previous sections have illustrated the strong interactions between upstream and downstream service activities and goods producing, particularly manufacturing industry. Certain of these relations have been explored in more detail from the viewpoint of the effect of changes in regulation for services on competition and trade both on the sectors themselves and with regard to their impact on the rest of the economy. Two major types of policy conclusion can be deduced, one concerning the appropriate way to look at the impact of changes on the services concerned, the other on how to view and develop policy towards both industry and services in the context of today's economy.

It is not sufficient to demonstrate that there is a connection between the regulation of a service and some variable of interest. The exact regulation or failing that the type of regulation must be identified since individual regulations may have very different effects than those for regulation overall and it is important to be able to identify which particular regulations are causing the most negative effects on growth, employment or in the cases studied here on competition on the domestic market and trade. Ideally the specific channels through which a regulation affects outcomes should be specified. Even then it may be that a regulation that is burdensome may be required for public interest purposes when there is no other effective way of regulating the service.

While an econometric approach can be useful, knowledge of how the markets for specific services operate in practice will often be required. This can provide insights into which particular obstacles form a binding constraint on activity and help to narrow down the area of concern. The workshops organised by the author in the European Commission in 2007 were an example of how policy makers can obtain information easily and at low cost (Smith, 2007). The econometric analysis presented previously of conduct regulations, specifically restrictions on the permissible legal form for professions and the ability to cooperate between professions, has confirmed the insights previously garnered from the workshops that these restrictions are particularly burdensome for the ability to enter markets effectively. “Softer” forms of information and “harder” forms such as those presented here are indeed complementary.

The identification of particularly burdensome forms of regulation helps to go beyond the generic policy of more or less regulation to concentrate on the individual changes that are required. Many services will continue to be regulated in future, sometimes regulation of incumbents is even required to open up markets to competition as has been seen in numerous cases for network services. The term “de-regulation” is therefore inappropriate as a term for policy towards services and should be replaced by that of “appropriate regulation” by which is meant the regulation that achieves public policy aims with the minimum adverse effects.

Arguments about the nature of industrial policy, whether it should be so-called “vertical” or “horizontal” by which is usually meant “interventionist” or “non-interventionist” have largely been laid to rest although they resurface occasionally. It can be shown that framework conditions that apply to the economy as a whole can have very different effects on individual sectors whether manufacturing or services. Intellectual property rights provide an example. For pharmaceutical firms patent protection represents an indispensable part of their competitiveness. For information technologies it is the danger of being locked out of key technologies through patent thickets that represents the main issue for intellectual property. Other sectors may not patent because speed to market is more important than the time consuming procedure for obtaining a patent or because other forms of intellectual property are more important for that sector (trade marks for luxury goods or copyright for services). The fact that a policy which applies to the economy as a whole may have very different impacts on different sectors pleads in favour of examining more closely those impacts when formulating the policy in question not in favour of more targeted policies towards individual sectors.

The revival of interest in manufacturing industry in advanced industrial countries of western Europe has been driven partly by fear that these countries will no longer be able to maintain a strong manufacturing sector in the face of strong competition from China and other emerging markets and by the re-composition of supply chains around foreign direct investment in lower cost locations nearer home, particularly new members of the EU in central Europe. It has also been driven by the search for secure, well-paying jobs for those without advanced skills that manufacturing used to provide. While ultimately innovation, the provision of ever higher quality products and control of costs are the principle ways to maintain competitiveness in high cost locations such as Belgium, the overall environment for doing business and the very specific ways in which manufacturing interacts with services both upstream and downstream should not be neglected. Competitive suppliers of services constitute themselves an important competitive advantage for manufacturing industry – and one

that is relatively hard to replicate since it is built around intangibles and tacit knowledge. Nor should the importance of a competitive distribution sector be neglected because high mark ups dampen demand for goods and create rents between the consumer and the producer to the detriment of both a situation that has for instance been observed in southern Europe for a lack of pass through to final consumers of opening up the market for apparel under the Uruguay Round of trade negotiations.

The very strong linkages between upstream and downstream services and goods producing industries illustrated in figure 1 and explored in more detail in this paper would indicate that no policy towards manufacturing can be effective if it ignores the conditions under which such services are provided. The concept of “industrial policy” would then need to be broadened to include the relevant services so that it becomes a policy towards the productive sector in the sense of “standortspolitiek”. While this concept of policy may be considered too broad, it retains a sense of focus if the emphasis is placed on the interaction between different actors and different sectors rather than on each one taken individually. It ought also to be mentioned that certain very important services (public administration, non-market services and market services to households other than trade and distribution) are not in the first instance concerned by such an approach since the linkages with the rest of the economy are much less developed.

7. Conclusion and Further Work

This paper has set out a way to measure the impact of regulation of a service on both the service itself and the wider impact on the rest of the economy for a single country, Belgium. The information requirements particularly for the first stage of the procedure are high. It would of course be desirable to have such evaluations for a wider array of countries and also to be able to see how the impact of regulation changes over time.

Often it is the impact of regulation on the dynamics of an economy that are of interest. Here many other types of factors than regulation specific to a sector come into play. A dynamic model of entry, exit and growth using panel data and constraints in the form of different types of regulation including those that affect an economy as a whole, such as labour market regulation or ease of doing business, along with other important explanatory variables would be a more suitable approach to evaluating the effect of service specific regulation on growth of turnover, value added or employment. Since these areas are those of the most of interest to policy makers, such an approach marks a logical extension to the procedure outlined here, but the information requirements are even more demanding.

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Appendix 1

Methodological approach

To start with, we shall use the following notation:

Z = domestic intermediate input-output matrix

I = identity matrix

x = output column vector

Backward linkages are derived directly from the technical coefficient a_{ij} calculated as the ratio between the purchased input i in sector j and the output of sector j derived from the values in **Z**.

Input-coefficients

$$A = \mathbf{Z} * \text{diagonal}(\mathbf{x})^{-1}$$

In order to take into account the indirect value of inputs i present in other purchased inputs by sector j it is necessary to calculate the Leontief inverse or total requirements matrix given by:

Leontief inverse of input-coefficients

$$L = (\mathbf{I} - \mathbf{A})^{-1}$$

An equivalent matrix for forward linkages, the Ghosh matrix **G**, can be calculated from the direct output coefficients b_{ij} or the distribution of sector i 's outputs across sectors j that purchase inter-industry inputs from i .

Output-coefficients

$$B = \text{diagonal}(\mathbf{x})^{-1} * \mathbf{Z}$$

Ghosh inverse of delivery-coefficients

$$G = (\mathbf{I} - \mathbf{B})^{-1}$$

Appendix 2

Studies on price elasticities for network industries

Sector	Segment	Sub-segment	Period	Country	Source	Elasticity Low	Elasticity Average	Elasticity High
Electricity	Residential		1989	UK	Baker et al		-0.76	
	Residential		1999	Israel	Beenstock et al		-0.58	
	Residential		1999	Switzerland	Filippini		-0.3	
	Residential		2004	Greece	Hondroyannis Hotledahl &		0	
	Residential		2004	Taiwan	Joutz		-0.16	
	Residential		2004	US	Kamerschen & Porter		-0.93	
	Residential		2005	Australia	Narayan & Smyth		-0.26	
	Residential		2006	Spain	Labandeira et al		-0.78	
	Residential		1980-2002	US	Various authors	-0.7	-0.9	-1.4
	Industrial		1999	Israel	Beenstock et al		-0.44	
	Industrial		2001	Denmark	Bjorner et al		-0.48	
	Industrial		2004	US	Kamerschen & Porter		-0.35	
	Industrial		2001	US	EPRI	-0.9	-1.2	-1.4
	Telecommunications							
	Fixed	Access connection	1994	US & Canada	Taylor		-0.03	
	Fixed	Connection charge	2003	International	NZ Commerce Commission	-0.2		-0.04
	Fixed	Access subscription	1994	US & Canada	Taylor		-0.2	
	Fixed	Access charges	2003	International	NZ Commerce Commission	-0.2		-0.1
	Fixed	Domestic local	1994	US & Canada	Taylor		-0.375	
	Fixed	Local calls	2003	International	NZ Commerce Commission	-0.04		-0.11
	Fixed	Domestic medium	1994	US & Canada	Taylor		-0.65	
	Fixed	Domestic long distance	1994	US & Canada	Taylor		-0.75	
	Fixed	Long distance national	2003	International	NZ Commerce Commission	-0.1		-1.55
	Fixed	International	1994	US & Canada	Taylor		-0.9	
	Fixed	International	2003	International	NZ Commerce Commission	-0.3		-1.54
	Fixed	Broadband	2007	OECD	Cadman & Dineen		-0.43	
	Mobile	Subscriptions	2003	UK	Competition Commisison	-0.54		-0.8
	Mobile	Subscriptions	2002	US	Rodini et al		-0.43	
	Mobile	Subscriptions/access	2003	International	NZ Commerce Commission	-0.06		-0.54
	Mobile	Calls	1998-2002	Austria	Dewenter & Haucap	-0.61	-0.74	-1.05
	Mobile	Calls	2003	UK	Competition Commisison	-0.48		-0.62
		Mobile originated calls	2003	International	NZ Commerce Commission	-0.09		-0.8
		Fixed to Mobile	2003	International	NZ Commerce Commission	-0.11		-0.8
	Mobile	Access & usage	2002	US	Rodini et al		-0.6	

		Mobile	2003	Australia	Access Economics		-0.8	
		Mobile	1984-1988	US	Parket & Röllner		-2.5	
		Mobile	1998-2002	EU	Grzybowski	-0.2		-0.9
Postal								
	Letters	Aggregate	Unknown	US	Robinson Pimenta & Ferreira	-0.2		-0.8
	Letters	Aggregate	1960-1999	Portugal	Florens, Marcy & Toledano		-0.16	
	Letters	Aggregate	1969-1999	France	Nakervis et al		-0.27	
	Letters	Aggregate	1977-1999	UK	Dubin		-0.2	
	Letters	Letters	1984-1996	Canada	Florens, Marcy & Toledano		-0.598	
	Letters	1st+2nd Class	1969-1999	France	Nakervis et al		-0.3	
	Letters	First Class	1976-1999	UK	Royal Mail		-0.91	
	Letters	First Class	1976-2000	UK	Nikali		-0.68	
	Letters	First Class	1975-1995	Finland	De Ryke et al		-0.78	
	Letters	First Class	1998	France	Nakervis et al		-0.82	
	Letters	Second Class	1976-1999	UK	Royal Mail		-0.61	
	Letters	Second Class	1976-2000	UK	Nikali		-0.3	
	Letters	Second Class	1975-1995	Finland	Florens, Marcy & Toledano		-0.15	
	Letters	2nd Class+Direct Mail	1969-1999	France	De Ryke et al		-0.68	
	Letters	Second Class	1998	France	Nikali		-0.17	
	Letters	Bulk mail	1971-1991	Finland	Santos & Lagoa		-0.3	
	Letters	Admail	1984-1996	Canada	Cazals et al		-0.423	
	Letters	Direct Mail	1998-1999	Portugal	London Economics		-0.845	
	Letters	Direct Mail	1980-2007	UK	WIK-Consult		-0.92	
	Letters	Bulk mail	2001-2011	Ireland	Cazals et al		-1.17	
	Letters	Advertising mail	2011	NL	WIK-Consult		-0.5	
	Letters	Commercial Mail	1980-2007	UK	WIK-Consult		-0.17	
	Letters	Office mail	2011	NL	WIK-Consult		-0.25	
	Letters	Transaction mail	2011	NL	WIK-Consult		-0.3	
	Letters	Metered	2001-2011	Ireland	London Economics		-0.39	
	Letters	B2B	1991-2007	Finland	Nikali		-0.37	
	Letters	B2C	1991-2007	Finland	Nikali		-1.38	
	Letters	Social mail	1980-2007	UK	Cazals et al		-0.52	
	Letters	Stamps	2001-2011	Ireland	London Economics		-0.22	
	Letters	Social mail	2011	NL	WIK-Consult		-0.2	
	Letters	Consumers	1991-2007	Finland	Nikali		-0.0043	
	Letters	Periodicals	2011	NL	WIK-Consult		-0.3	
	Letters	International	2011	NL	WIK-Consult		-0.3	
	Parcels		1990-2005	US	Geddes		-1.013	
Air Transport								
	Long haul international business		Unknown	International	Candian Dept Finance	-0.198	-0.265	-0.475
	Long haul international leisure		Unknown	International	Candian Dept Finance	-0.56	-1.04	-1.7

Long haul domestic business		Unknown	International	Candian Dept Finance	-0.836	-1.15	-1.428
Long haul domestic leisure		Unknown	International	Candian Dept Finance	-0.787	-1.104	-1.228
Short haul business		Unknown	International	Candian Dept Finance	-0.595	-0.7	-0.783
Short haul leisure		Unknown	International	Candian Dept Finance	-1.288	-1.52	-1.743
Aggregate		Unknown	International	Brons et al	-0.527	-1.146	-1.765
Aggregate	Intra-Europe	1996-2006	International	Iata		-1.4	
Aggregate	Trans Atlantic	1996-2006	International	Iata		-1.2	
Aggregate	Europe-Asia	1996-2006	International	Iata		-0.9	
Rail Transport							
Consumer	Peak	1990	Belgium	Mayeres		-0.37	
Consumer	Off-Peak	1990	Belgium	Mayeres		-0.43	
Consumer	Average	1980s	UK	Goodwin	-0.47	-0.79	-1.11
Consumer	Average	1987	UK	Owen & Philipps	-0.61	-1.08	-1.38
Consumer	Economy	1987	UK	Owen & Philipps		-1	
Consumer	1st Class	1987	UK	Owen & Philipps		-1.17	
Business Non-business	Intercity	1980s	US	Oum et al	-0.67		-1
	Intercity	1980s	US	Oum et al	-0.37		-1.54
Freight	Aggregate	1980s	US	Oum et al	-0.35	-1.52	-1.06
Consumer	Suburban Rail	1951-2002	UK	Wardman & Shires	-0.27	-0.6	-0.93
Consumer	Intercity	1951-2002	UK	Wardman & Shires	-0.48	-0.9	-1.32
Business	Intercity	1988	UK	Kroes & Sheldon		-0.7	
Discretionary	Intercity	1988	UK	Kroes & Sheldon		-1.4	
	Intercity	1984	Ireland	McGeehan	-0.37		-0.4
	Intercity	1983	Canada	Oum & Gillen	-1.08		-1.538
	Urban (peak)	1992	Australia	Nairn & Hooper		-0.3	
	Intercity	1992	Australia	Nairn & Hooper	-0.7		-1
Professional Services							
Legal		Unknown	US	McTaggart, Findlay, Parker	-0.37	-0.61	
Professional		Unknown	US	McTaggart, Findlay, Parker		1.09	

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XXV. International RESER Conference: Governance for collaborative development of service and system innovations

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This paper studies the multi-actor collaboration in the service innovation using the concept of ServPPINs. We concretize forms of such new governance mechanisms in which the solutions to societal problems are based on the integration of technological and service based novelties, and which appreciate partnerships, negotiation and trust between multiple kinds of actors. The study focuses on service innovation in the environmental sector.

1. Introduction

The objective in this paper is firstly to study the collaborative forms of system and service innovations and secondly to illustrate how the collaboration in innovation can be supported with the mechanisms of network governance (e.g. Lévesque, 2013; Hartley, 2005; Moore & Hartley, 2008). The focus is specifically on *service and system innovations in the environmental sector*.

Environmental sustainability is one of the so called “grand societal challenges” referring to extremely complex global societal problems that are systemic by nature and cannot be solved via individual product or service innovations created in individual organisations. Conversely, the challenges require the combination of various innovations and their effective dissemination on the basis of continuous interaction and dynamic between different organisations and parts of society (Toivonen, 2015; Geels, 2002; Rubalcaba et al., 2013; Gadrey, 2010; 2004; 2010). Thus, besides the combination of technological and service innovations, system and social innovations are required. *System innovation* refers to a renewal of whole set of networked supply chains, patterns of use and consumption, infrastructure, regulations etc. that constitute the socio-technical system providing basic services such as energy provision (Smith et al., 2010). To develop system innovations new operational model based on the simultaneous development of organisations, technologies, services and multiple network relationships (Gallouj, 1994; 2002; Windrum and García Goñi, 2008; Harrison et al., 2010; Rubalcaba et al., 2012) are required.

A prerequisite for the realisation of these system level challenges is the active engagement of various actors in the creation, implementation and diffusion of innovations. Thus, system innovations are interlinked with *social innovations*, characterised in the recent literature by the two different aspects of social: it is social by its ends and by its means. First ‘social’ refers to the societal challenges (e.g. environmental sustainability) innovations are aiming to solve and the second aspect of ‘social’ refers to participatory and networked processes without which it is not possible to create innovation in a multi-actor environment (Toivonen, 2015; Harrison 2011).

However, in the literature the networked structure of innovation has been understood only partially. Large amount of literature is focused to analyse innovations from the organisational perspective (Moore & Hartley, 2008) and typically private and public innovations have been studied in isolation (Rubalcaba et al., 2013). In addition, understanding the different logics and drivers of innovations in private and public sectors is insufficient. That may produce a partial and incomplete understanding of the drivers, dynamics and impacts of innovations and services (Levesque, 2013; Moore & Hartley, 2008; Hartley, 2005; Rubalcaba et al., 2013). What is needed in the comprehensive understanding of the collaborative development processes providing societally important innovations and how it can be supported from the perspective of broader social decision-making system (Moore & Hartley, 2008.)

Recently introduced network concept ServPPIN (Public-private innovation networks in services; Gallouj et al., 2013) aims to bridge this gap and focuses to the complementarities and synergies between public and private service providers (Rubalcaba et al., 2013). ServPPINs have been developed as a mode for organising diverse actors, competences and knowledge in complex service innovation processes and thus for driving the systemic change in flexible, cooperative and interconnected way (di Meglio, 2013). They can be seen as a practical way to create cooperative and interactive arenas to tackle the growing complexity. These new mixed organisational arrangements have mainly emerged as a result of the modernisation and reform trends in the public sector reflecting a change in focus in public service provision: from cost-efficiency, markets and consumers towards complexity, co-production and public value (Rubalcaba et al., 2013; Levesqué 2013). This development manifests the broader paradigmatic change gaining ground in the governance system. Instead of hierarchical top-down coordination (e.g. new public management), there is a tendency towards non-hierarchical, de-centred governance mechanisms (Lévesque, 2013; Hartley, 2005; Sorensen & Torfing, 2007). The new networked way of governance is seen as a possible answer to the challenges posed by increasing societal fragmentation, complexity and dynamism (Sorensen & Torfing, 2007).

This paper studies the multi-actor collaboration in the environmental services using the concept of ServPPINs (Gallouj et al., 2013). We concretize forms of such new governance mechanisms in which the solutions to societal problems are based on the integration of technological and service based novelties, and which appreciate partnerships, negotiation and trust between multiple kinds of actors (Hartley, 2005; Voss et al., 2007; Moore & Hartley, 2008; Levesqué, 2013.)

Empirical data of the study is collected in Finland and describes on a new policy instrument SHOK (Strategic Centers for Science, Technology and Innovation) accelerating service, system and social innovations in the area of environmental sustainability. Data has been gathered from face-to-face interviews (35 in total), observations of six collaborative workshops, program documents and other strategy material.

The paper is structured in five sections. The second section after this introduction presents the central literature focusing on system and service innovation, new governance mechanisms to support the innovation development in the complex and system context and ServPPIN as a manifestation of novel networked based governance. The third section presents the case context in energy and environment sector and research methodology we have applied in data gathering and analysis. In the fifth section we describe our results and the final section sums up the study, provides some managerial and policy implications and gives ideas for further studies.

2. Theoretical background

2.1. System change through social innovation

Today the challenge of sustainable development is increasingly understood as a transition towards more sustainable socio-technical systems (Elzen et al., 2004; Geels, 2010). The perspective of socio-technical systems acknowledges difficulty in studying the sustainability of isolated technologies and services, if not analysed as embedded in a broader context. It points out strong interdependencies between various elements of the systems which impede new ways of organising the provision of renewable energy, for instance. The analytical challenge is to understand these interdependencies in a dynamic system, and then to identify how innovation can induce a transition to other, potentially more sustainable, systems. (Geels, 2005; Smith et al., 2010.) Sustainable systems innovation implies that major changes are required along the entire production-consumption chain, its flows, its multi-level architecture, its institutions and structures including policy and governance processes, and – not least – the behaviour of the actors involved in it, from resource extraction to the final consumption of goods and services (Weber and Hemmelskamp, 2005; Smith et al., 2010).

However, the current literature on systemic change concentrates relatively much to the introduction of new technologies and obscures the discussion and questions how to intervene in ordinary practices and dynamics to accelerate the systemic change (Showe and Walker, 2010). The perspective of social innovation is needed to create understanding of the participatory and networked processes without which it is not possible to create innovation in a multi-actor environment (Toivonen, 2015; Harrison, 2011).

This paper studies the social innovation as participatory and collaborative processes which are necessary for the emergence and implementation of innovations in a multi-actor environment. Also in the novelties created, new ways of interacting is an important ingredient. Thus, the activities and actors involved have often been highlighted as the most distinctive feature of social innovations. Social innovations may emerge at the grassroots level among users and employees; they may be produced in the collaboration of private, public and third sector organisations; or they may be initiated by policy makers and regulatory bodies. In all cases, integration of bottom-up and top-down processes is essential (Rubalcaba et al., 2013).

Bottom-up grassroots activities are seen as an ‘engine of social innovations’. The process of creation and implementation of social innovations highlights empowerment: the role of citizens is an active co-developer. The importance of bottom-up processes is clearly observable in the sustainability context. The behaviour of consumers has a crucial impact on the achievement of the goals set. A change in user preferences is necessary in order to avoid undermining the improvements in the production and delivery of energy by consumption patterns (Weber and Hemmelskamp, 2005).

Equally important are the top-down processes which translate the general objectives into concrete policies and practices in circumstances characterised by societal and political dispute (Meadowcroft, 2009). They are needed for the materialisation and dissemination of social innovations. Community decision makers and company ma-

nagers have to support, recognise and organise bottom-up processes in order to make ideas implementable and scalable (Høyrup, 2010). Policy actors have to enhance society's innovation capacity by revitalising innovation institutions and by fostering the innovation activities of public, private and third sector organisations (Rubalcaba et al., 2013).

2.2. Governance mechanisms to accelerate systemic change

Above described developments have significant implications to public policies and create need for new governance approaches that support the collaborative and dynamic development and implementation of social and system innovations. In addition, the future of services are seen to shaped through new type of governance mechanisms which includes the rise of networks and partnerships, innovations as democratic practice, the development of "choise" and co-production of service models (Langergaard, 2011; Newman & Clarke, 2009).

Even the tendency in the literature is towards networked forms of governance (Levesqué, 2013; Moore & Hartley 2008) there is no agreement that in practically network governance is currently the dominant steering mechanism in public sector. More likely the public sector steering and decision making is still organised based on bureaucratic and new public management (NPM) (Levesqué, 2013; Moore & Hartley, 2008) that focuses on economic and technologist views of innovation and service and does not take into account their collaborative, interactive and dynamic nature. Therefore governance may be seen rather a problem producer than a problem solver (Voss et al., 2006) which may hinder the innovation activities in complex and continuously evolving society.

This critique reflects the broader paradigm change gaining ground in the governance system (Newman and Clarke, 2009). Although the benefits of hierarchical new public management based coordination are indisputable compared to the earlier bureaucratic view (Hartley, 2005; Moore & Hartley 2008; Levesqué, 2013) the limits of NPM have become apparent along with the development towards increasingly complex issues, involvement of multiple actors and need for open dialogue (Sørensen, 2002). The shift from hierarchical top-down "government" to more horizontally organised self-regulating networks of governance (Sørensen & Torfing, 2007) has been seen as a possible answer to the challenges posed by increasing societal fragmentation, complexity and dynamism (e.g. Levesqué, 2013; Moore & Hartley, 2008, Voss et al., 2007; Sorensen & Torfing, 2007; Hartley, 2005; Rhodes, 1997) and useful mechanism that supports the innovation development frequently along the continuously changing societal conditions (Voss et al., 2006).

However, because of the comprehensiveness of changes in governance it is not simple and immediately clear how to apply these transitions in practice (Shove and Walker, 2010). Recent literature have analysed the central aspects from the practical point of view to identify the factors which challenge the application of new governance culture (Shove and Walker, 2010; Moore & Hartley, 2008). According to the literature, fundamental problem lies in understanding the interaction between top-down and bottom –up approaches and co-creation with different actors and actor groups including the public private and third sector organisation not forgetting the central role of citizens in “doing” the change.

2.3. Public-private innovation networks (ServPPINs) in conducting the change

ServPPINs (Gallouj et al., 2013) have emerged as a result of the above described modernisation trends in the public sector (Di Meglio, 2013). They are reflections of novel forms of governance which focuses to the rise of networks and partnerships, innovations as a democratic practice, the development of “choice” and co-production of services and innovation (Langergaard, 2011; Newman & Clarke, 2009). ServPPINs embody flat and flexible types of organisations which aim to develop synergies between different knowledge, competences, interests, objectives and services that different partners bring in to the network (Gallouj et al., 2013; Di Meglio, 2013; Rubalcaba et al., 2013).

In the heart of the ServPPIN is the collaborative relationship between public and private sector partners. Compared to the traditional innovation networks, ServPPINs highlight the equal role of public sector service providers and manufacturing firms. Instead of having limited role in providing infrastructure, financing and institutional framework public organisations may be real co-producer of service innovation by initiating, organising and propagating new ideas (Di Meglio, 2013). Moreover to facilitate better matches between technology and demand ServPPINs involve consumers, intermediate users and third sector organisations to be active collaborators (Rubalcaba et al., 2013). Based on the empirical studies on ServPPINs (eg. Rubalcaba et al., 2013) their potential is in credibility, dissemination, speeding up the process of agenda setting and decision making, provision a more comprehensive view of the problems, legitimacy, resources and efficiency, learning capacity and knowledge transfer.

There are some key features which help to understand how ServPPINs operate. *Firstly*, they are grounded on a *broad concept of innovation* brought about by evolutionary economics (Nelson and Winter, 1982; Kline & Rosenberg, 1986; Dosi et al., 1988; Dosi, 1999) that highlights the dynamic nature and integrative perspective of innovations in which both technological and non-technological aspects have a crucial role. *Secondly*, they are formed as multi-agent frameworks (Windrum & Garcia-Coñi, 2008; Windrum, 2013) in which the variety of actors from the public private and third sectors is involved both in the innovation process and delivery of final service and in which each of the actors incorporate their specific competencies and interests into the innovation process. By engaging various actors in the different phases of innovation they may promote systemic change in sectors concerned (Weber & Heller-Schuh, 2013). *Third* aspect relates to the life –cycle perspective referring to the evolution of ServPPIN through different phases. Phases are design (1), pilot and imple-

mentation (2) and consolidation (3) which may affect to the dynamic and composition of ServPPIN. *Fourthly*, they are characterised by the open, complex, uncertain and interactive trust based (Fuglsang, 2013) process in which the several driving forces influence to the final outcome. The level of “formality” and structuring of relationships may vary, but typically certain degree of formalization is usually required (e.g. exploitation of intellectual property rights).

Djellal and Gallouj (2013) propose a typology of ServPPINs. The criteria used for the typology pays attention to the nature of innovation (e.g. tangible and intangible nature of innovation) and the characteristics in its’ development process (planned and unplanned nature of development).

Table 1. ServPPINs according to their complexity (modified by author from Djellal & Gallouj, 2013)

Analytical dimensions	ServPPINs according to their complexity			
Type of ServPPIN	Simple ServPPIN to adopt technological innovation	Simple ServPPIN to co-produce technological innovation	Simple ServPPIN to co-produce non-technical innovation	Complex ServPPINs to adopt, produce and enhance implementation of complex architectural innovation
Type of innovation	Technological innovation		Non-technological innovation	Broad based, complex innovation including various technological and non-technological innovations
Dominant type of innovation process	Planned innovation		Unplanned innovation	Planned/unplanned innovation including both bottom up and top down innovations
Theoretical perspective	Assimilation		Demarcation	Integration

As set out in the table 1 four types of ServPPINs are identified: 1) simple ServPPINs set up to adopt a technology; 2) simple ServPPINs set up to produce technological innovation; 3) simple ServPPINs set up to produce non-technological innovation; 4) complex or architectural ServPPINs. These ServPPIN types are also related to traditional service innovation perspectives: assimilative (or technologicistic), demarcative (or service-oriented), and Integrative (Gallouj and Weinstein, 1997).

3. Research context and methodology

3.1. Case context

The focus in the selected case-study is to provide information how recently established Finnish policy instrument SHOK – Strategic Center for Science, Technology and Innovation – operating in the area of environment and energy, promotes the systemic change and industrial renewal in energy and environment sector. Centres operate as not-for profit limited companies build on public-private partnership aiming to enhance collaboration and interaction between business life and academia over the traditional industrial sectors. Their main goal is to renew industry clusters and to create system innovations to meet the needs of Finnish industry and society within five-to-ten-year period.

In this case study our focus is in Cleen-SHOK (later Cleen) which aims renew the energy and environment cluster and to promote industry's competitiveness in the area. Cleen has currently 44 shareholders including companies (28 in total) and universities and public research organisations (16 in total). The focus areas and operational activities are based on a strategic research agenda (SRA) jointly defined by the partners. The targets of the research agenda are operationalized through long-term research programs carried out in collaboration of research organisations, universities, companies and other actors. Funding for the programs is coming from multiple sources. An average forty per cent is co-funded by partner firms involved in it, ten per cent by public research organization and the rest is coming from public funding providers such as Finnish Funding Agency for Innovation (Tekes) and the Academy of Finland. The SHOKs also apply to EU research programs for funding.

We examine specifically three ongoing research programmes and the preparation of two “second generation” programmes. The ongoing programmes are 1) *‘Distributed Energy Systems’* (DESY) aiming to increase the production of renewable energy and the promotion the use of hybrid energy technologies, 2) *‘Smart Grids and Energy Markets’* (SGEM) aiming to develop smart grid architectures and, intelligent management and solutions for smart consumption and customer interface. Interaction between ICT systems and energy systems is a central innovation behind the advancements in this area and 3) *‘Measurement, Monitoring and Environmental Assessment’* (MMEA) that aims to develop an environmental information systems to monitor and evaluate the environmental efficiency of various industrial processes, products and infrastructures. Two programmes in preparation relates to the development of *‘architecture of sustainable energy systems’* and *‘healthy urban living’*. The former aims to provide holistic view needed for the energy system revolution towards sustainable and flexible system. Programme focus is on optimal integration of centralised and decentralised energy resources and production on system level as well as flexible use of various energy carriers (electrical networks, gas, heat, cool). The latter programme “healthy urban living” aims to increase urban resilience and well-being of citizens. It focuses on the interaction and interlinkages in urban system taking into account the energy chain, human behaviour, environmental and meteorological data, air quality and its effect on human well-being. It engages the citizens and enhances the co-production of urban system between different societal actors.

Cleen can be characterized as ServPPINs generating complex and architectural innovations (Djellal & Gallouj, 2013). Following table 2 describes our case context in the analytical dimensions of ServPPIN.

Table 2. Cleen SHOK as a ServPPIN

Analytical dimensions	Description	Cleen as a ServPPIN
Goal, type of innovation	Broad perspective to innovation; complex, architectural innovation including various forms of technological and non- technological innovations	Complex innovation to promote the systemic change and industrial renewal in energy and environment sector and to define e.g. “the new architecture of the future energy system”. System renewal requires variety of technological and non-technological innovations; e.g. new patterns in production and consumption of energy.
Type of ServPPIN	Complex ServPPINs to adopt, produce and enhance implementation of complex architectural innovation Multi-actor network	Co-production of various forms of technological and non-technological innovations 44 shareholders representing private and public organisations and different parts of the system Multi-actor collaboration essential to co-develop new competences, to promote the creation of new business and industrial competitiveness and to enhance the implementation of complex innovations in the area of energy and environment
Dominant type of innovation process/ dynamic	Planned/unplanned innovation requires both bottom up and top down innovations developed both within formalized models and various informal models (e.g. bricolage & rapid application models)	Systemic change in energy end environment sector requires innovations in every level of society and is based on top down strategies and activities as well as bottom up activities and experiments. The systemic change is promoted by both by formalized and informal models of innovation.
Theoretical perspective	Integrative	Renewal of energy and environment sector is based on the collaboration of multiple actors representing the different sectors of society and on the integrative solutions combining multiple types of technological and non-technological innovations.

Regarding to the goals Cleen aims to tackle with prominent societal challenges, among which the environmental sustainability is primary. It accelerates new system level innovations and industrial renewal through new type of interaction and co-creation. The innovations developed in the network can be characterized as complex combinatory innovations encompassing both technological and non-technological ingredients and are developed in the collaboration between multiple actors.

3.2. Data collection and analysis

In order to gain an in-depth understanding of the governance in the case organisation, we gathered data from four types of sources. *The primary* instrument for data collection was face-to-face interviews (35 in total). The interviews were gathered between February and June 2013. Some complementary interviews were done in

spring 2015. We applied snowball sampling in the identification of interviewees: the first respondents were Managing Director of Cleen Ltd and the Programme Managers. Based on their suggestions, we thereafter selected the other interviewees among the members of the programme consortiums. The final sample represented actors in the area of sustainable energy and environmental measurement in a versatile way. It consisted of representatives of small and medium size companies (SME's) and large companies in the field of environmental measurement and sustainable energy. In addition the experts representing universities and other public research organisations in the same fields were interviewed. All interviewees were managers or senior experts in their background organisations and they had a significant role in the preparation and implementation of research programmes. Typically they were acting as program managers, work package leaders or they were leading the service demonstration development as a part of the programme implementation. Interviews were complemented during the spring 2015 by the interviews of technological and development managers of Cleen.

We applied a semi-structured interview method: the topics were decided beforehand but within them the respondents were given a great deal of freedom (Bryman and Bell, 2011). We structured the topics on the basis of our theoretical analyses in the areas of the systemic change and innovation in the area of energy and environment, governance and management of the innovation process in ServPPINs and roles and responsibilities of network actors in the innovation process. The duration of the interviews ranged from one and half to three hours. All interviews were recorded and transcribed.

Second source of material gathered were observations of new programme preparation process. We took part in six collaborative workshops which were directed to company, university and research organisation participants to work on new research programmes. Workshops took place during the spring 2014 (February-May). During the meetings we wrote up field notes based on the discussions. To complement the field notes we had access to the official minutes of meetings, which were provided by the case organisation.

Third source of information is the material provided during the preparation phase of the new programmes. Thanks to our access to the digital working space we were able to follow the programme documents and other material provided in the course of programme preparation. *Fourth* information source we have utilized is the strategic documentary material provided by the case organisation. These include, for example, the strategic research agendas, guidelines and criteria for the programme preparation, annual reports and programme result material.

4. Research results

4.1. Tackling the societal challenges in the collaboration of multiple partners

Based on our data, Cleen Shok is one of the central actors in the Finnish innovation system to tackle the above described environmental challenges and enhance a systemic change in the energy and environment sector. The role of research pro-

grammes has perceived to be especially important in the creation the comprehensive picture of the required transition, in the definition of strategic research questions and in the identification the central actors who are needed to solve the identified problems and thus to enhance system level change.

According to our interviews the empowerment of multiple actors representing variety of sectors, competences and world views is in essential role both in creating holistic understanding of the requirements of system level change and in developing solutions that correspond with these comprehensive needs. They highlighted that the novel programs have accelerated the network generation over the traditional organisational borders and have thus enabled the generation of strategic understanding and development of completely new competences required for the systemic change. For example in the SGEM programme interaction between energy and ICT systems is in central innovation behind the advancement of novel smart energy infrastructure. Like revealed in interviews in face of complex and systemic problems actors are running out of competence and are not capable of handling systemic problems without the support of broad based network:

“Understanding the ongoing change is anything but a linear process. To create general understanding we need multiple organisations, multiple actors, multiple backgrounds. One actor understands this and other actors that and together we are able to create a holistic view of the ongoing changes. Without the collaboration of many actors the creation of strategic view is no possible. For that reason we did not have strategic understanding of the ongoing changes in energy sector before the first SHOKprogramme period”. (Representative of university A)

“We are running out of competence alone regarding the systemic transition in the energy and environment sector. Thus we need to have variety of playmates who have different types of competences required for the creation of holistic understanding of the ongoing change” (Representative of large company A)

However, compared to traditional research and development programs collaboration between multiple partners and over traditional sectoral borders also complicates the structure of networks. For example in the SGEM encompasses in total 21 industrial partners from energy sector including for example energy technology providers, power production companies, energy distributors, energy sector service providers and from ICT sector including for example software developers, network providers and network safety consultants. In addition eight partners representing universities and public research organisations are in the core of the network. And in the first preparatory workshops of new ‘healthy urban living’ -programme approximately hundred participants representing variety of public, private and third sector organisations took part. Although the structure is complicated, the interviews revealed that extensive participation ensures both the system level problem solving and real co-creation.

“On the one hand traditional research programs are more clear and simple in their structure, but on the other hand they have not managed to incorporate all the actors needed for the system level problem solving. In addition traditional research programmes lack of real will and capacity of co-creation. By empowering all the central national partners SHOK programmes have man-

aged to create a forum for real collaborative innovation ” (Representative of public research organisation A)

Although in all the interviews multi-actor collaboration was commended the central notions regarding the participating actors is the abundance of research and company actors and absence of other public sector authorities, municipalities and citizens. Interviewees agreed that in the first generation programs the focus has primarily been in development of new technologies and solutions. Instead the broader understanding of citizens' needs and societal aspects has been lacking. They admitted that to create comprehensive understanding of the healthy urban living conditions or the requirements of novel comprehensive energy architecture, new actors and competences need to be incorporated in the programs networks. Like revealed in interviews understanding the function of political and social systems including the power relations and consumer needs and behaviour are in crucial role in order to support acceptance of novel solutions and enhance the systemic change.

“To tackle the ongoing transition in energy sector we need to incorporate the competences and perspectives of multiple actors. Technology is the easiest part of the transition. To really be able to tackle the complex needs of system change we need to incorporate new actors and competences into our network. We need to have understanding of the energy as a political issue. In addition we need to understand what customers really need and how do they behave. When we have comprehension of these societal aspects of energy and their dynamic interaction in the system we may be able to develop viable and comprehensive service solutions and novel business concepts. (Representative of university A)

Interviewees admitted that the program actors are just awakening to the need of sociological competences and that in the next generation programmes new competences need to be incorporated to broaden the perspective to systemic change. Based on our observations in the preparation of the “second generation” programs the centrality of citizen centric approaches and participation of public authorities have been taken into account. For example in the currently ongoing preparation of healthy urban living –program the behavior and need of citizens and role of municipalities as service development “platform” have been taken into account in strategic research agenda and attendees of the programme.

Like highlighted in interviews broadening the collaboration is crucial not only for the development but also for the implementation of better and viable solutions. The most of the actors were confident that the active participation of companies and complete value chains in the programs supports the practical implementation of the results, which is required for the systemic change. The actors believed that the evidence gained through pilots and demonstrations carried out in ongoing programs manifests also successfulness of the programs and support the systemic change. Like the citation below illustrates specially the co-development with large companies was seen crucial because of the ability to enhance the change also through companies strategies.

“To really make systemic change happen it is important to have large companies in these networks. They are also capable of enhancing the transition through their organisational strategies and programs” (Representative of large company A)

However, the success on SHOK-programs is manifested only if the new knowledge and innovations developed in the programs can be executed as nationwide decisions and implemented for example as new structures for energy production system and healthier urban architectures. Like some of the interviewees regretted currently the application of the research results in real life situations is too slow. One reason given is the above described insufficient collaboration with users. Besides an inadequate communication with decision-makers was seen as a bottleneck for insufficient implementation of the results. Although, several program actors were active in collaborating with national and local policymakers and some of the actors were participating in EU and national working groups, the interviewees called for more systematic collaboration with decision makers. Like interviewees revealed, to really enhance the systemic change more influence on decision-making and more systematic collaboration with the policymakers and other interest groups are needed.

"Currently the actors have produced lot of paper. But nothing is really happening if we don't have courage to implement the results. Now the research is going round in circles. Instead we should be thinking how and with whom we implement the results as practical and concrete solutions and changes" (Representative of a small company A)

"We should be more active in communicating our research results to decision-makers. Single actors have been active in contacting national decision-makers and politicians. This is are very important if we want to have an influence and impact in society. However, we should be much more active in national and EU-level vision work to really have influence on the future developments." (Representative of large company B)

4.2. Creating new competences and business solutions in a trust-based collaboration

As shown above, programs have managed to create a model for a network type of collaboration which integrates variety of competences and actors needed for the enhancement of systemic change. According to our empirical data the innovative network structure and its ability to create novel competences is based, on the one hand, on the formal contracts and partnerships and on the other hand on the deep-going trust based collaboration which has been systematically facilitated by the Cleen and programme personnel. According to the interviews partners' role as formal shareholders is a good way to ensure the commitment and success of network collaboration. In addition the collaboration is regulated by formal contracts and intellectual property rights. However, their role in collaboration is reported to be less meaningful than the role of informal trust, which was highlighted in all interviews in attaining open and profound collaboration. Like one interviewed representative of university B pointed out *"without trust the collaboration is limited only to the change of information"*.

Informal trustbuilding has been systematically facilitated from the beginning of programme planning. According to our observations, Cleen has an active role in the matchmaking new partnerships and in the creation the forum for open and trust-based discussion. They organise an open call for multiple stakeholders to take part into the creation of research agenda in the series of workshops. By organising the workshops aim is to give voice to multiple partners' needs and to match companies

and research actors over traditional sectoral borders. According to our data, setting the common targets and planning the practical implementation in the interactive and collaborative process, weld the partners together from the beginning.

The operational principle of Cleen defines that programmes are industry driven meaning that the industry needs are high on the research agenda and the targets are mainly set by the stakeholder companies. Like one large company (B) representative revealed *“thanks to the novel programmes company targets are high on the agenda, whereas in the traditional research programs funding is directed to research done in ivory towers”*. Our informants considered that the companies’ will and ability to sit on “a driver seat” commit them into the network and is a core issue when aiming for a profound collaboration. However, interviewees also highlighted the centrality of research partners in balancing the longer term strategic research competences and shorter term business opportunities. Like the following situations demonstrate the combination of different type of targets enhances the understanding the other parties’ objectives and thus benefits the collaboration.

“This new instrument has created condition for true and open collaboration over company borders. Partners sit in the same meetings to set targets for the common development and they implement targets collaboratively. Companies are actually affecting the target setting and thus the company and user needs are taken into account in research and development work. Also our research partners have benefitted from the collaboration – they have said that now they understands better what are company needs and what are the challenges that need to be solved. In the best case this operational model generates an innovative platform for variety of organisations willing to tackle collaboratively our common societal problems.” (Representative of large company A)

“Programme instrument includes variety of actors from research and industry and it have managed to combine the long term visionary research work and concrete short term business objectives. The combination of different types of targets is essential for good trustbased collaboration and relevant to tackle system level problems.” (Representative of large company B)

According to interviews profound and trust based collaboration has been a stone base leading to new combinatory competences and the creation of integrative service solutions. Programs have for example generated the new type of coproduction between experts from energy and ICT sectors and thus facilitated the generation of comprehensive energy architecture. New combinatory competences have for example made possible the coexistence of centralised and distributed energy systems and guaranteed the safe energy flow in the system. In addition, by combining ICT in the energy system, programs are making possible to multiple actors to design, construct, steer and use the smart and flexible energy system in future. Like one large company (A) representative illustrates novel combination of competences and helps in tackling the challenges in the energy and environment sector. *“We have generated completely new competences with completely new partners. This creates a ground for a completely new industrial sector”*.

Novel combination of competences generates new strategic partnerships and gives a room for practical pilots and demonstrations. It benefits both companies and research partners. For example actors who develop platform for sharing environmental data

experience that the program has given rise to new knowledge cluster which has both ameliorated the scientific base in the area and supported the development of concrete business solutions. Like citations below illustrates close collaboration has led to the interdependence between partners. It has changed the way of thinking and doing business and has given rise to novel ecosystems. In addition it has is seen to be in strategic importance in ensuring the long-term business opportunities, in strengthening companies competitiveness and in facilitating their entrance into the international markets.

“Shok programmes have generated new type of collaboration between company partners. We have learned to collaborate fluently and openly with other companies which is not typical way of action in business. It has strategic importance for us and gives us a competitive advantage in markets five or ten years. In the future the firms who do not have the same capacity stays alone and focuses to the own narrow doings. These company networks are extremely important in the internationalisation of business. We cannot fight Chinese alone, but we can compete with them in the well-functioning company networks. Collaboration strengthens our competitiveness domestically and internationally” (Representative of large company A)

“For our company this programmes has been extremely important. It has especially supported our internationalisation into China. In Europe it is easy to operate for our type of small company. On the contrary it China operating alone is not possible. Without the support we get from this public-private innovation network it would be impossible to create business in China.” (Representative of small company B)

Building a trust based relationship and creating completely new collaborative ways of working is essential but not a simple issue. On the contrary it is time consuming work which is based on systematic and open interaction, recognition of common interest and value added of each party in the development. Learning to speak common language and having the shared working methods cannot be adopted immediately into the organisations. On the contrary it requires changes in mindset and ways of working. Single organisations need for example to adopt the idea of shared value which again affects the operational model and business logic in entire organisations and business networks. Although the needs for change were ambitious interviewees underlined, that the first generation programs managed to generate shared working methods and to increase understanding of the co-production of value when tackling the complex societal challenges.

4.3. Supporting the multi-actor collaboration by steering and governance mechanisms

Programmes are steered by multiple mechanisms and in different phases of their implementation. The most part of funding is coming from Tekes, who is both setting the criteria for funding and following the success of programs based on continuous reporting and evaluation. In addition Cleen is monitoring the success of the programs. According to interviews the double steering only increases bureaucracy and does not improve the program results. However it was seen as a small and bureaucratic snag: the bigger problem according to our empirical data is the governance criteria and

mechanisms of funding organisation which do not take into account the systemic nature of the programmes. The problem manifests as contradictory and mechanistic targets of evaluation, bureaucratic preparation process and restricting consortium rules.

Like discussed above, programmes aim to find solutions to complex environmental problems. A paradox when setting programme targets is to match them up to funding criteria which do not take into account the complex and systemic nature of the programmes. Criteria set by funding organisation are based on the linear view of innovation which emphasises the short term results such as publications, patents, computer softwares and new products. Long term systematic changes emerging in the collaboration of variety of actors are not taken into account. Like interviewees highlighted the problem in steering reflects the absence of good measures capable of capturing the integrative nature of solutions and their dynamic development process.

“The traditional evaluation and steering is based on concrete outputs of programs such as publications, softwares. But what we are actually developing is comprehensive and holistic understanding to support the societal transition in energy sector. Programs support the new ways of thinking and new societal structure, but how to measure these types of changes. It is paradoxal that there are no good measures for these systemic innovations. At the same time it is understandable that good measures do not exist yet. The changes would not be innovative and revolutionary if there were already measures for these changes”. (Representative of University representative B)

“Problem in steering of the programs is the traditional measures and indicators. Funding organisation is still focusing for example on the numbers of developed products or reviewed articles. We should report how many new products we have launched during the programs period and how many articles we have written. But the answer is none. Because this was not set as target. The targets for the programs are something completely different but the current measures are not able to capture the program targets which are much more holistic than these current measures. (Representative of large company C)

Problems in understanding the systemic nature of the development and challenges in finding good criteria are seen, from the viewpoint of programme participants as contradictory targets. On the one hand programs are supposed to be risk taking and renew industrial structures in a long term but on the other hand the indicators to measure their success remains rather concrete and highlights mechanical outputs. In concrete terms funding organisation for example expects short term readiness to launch new products and services into markets. However, according to the criteria concrete service and technology development in the programmes is denied. Like citations below illustrate the conflicting criteria make the preparation of the programmes schizophrenic and causes uncertainty about the role of different actors in governance of network.

“Problem is the contradictory funding criteria set by Tekes. On the one hand we are expected to promote export activities but on the other hand we are not allowed to do any service or project development. Steering is schizophrenic because of contradictory and too mechanistic targets (Representative of small company C).”

"Current steering is based on contradictory targets. On the one hand the programs need to be long term and risk taking and on the other hand programs should provide concrete short term results. I don't know if I should laugh or cry when thinking which targets to follow. Funny thing is that Tekes has denied us to develop concrete products, anyhow they are having it as a success indicator because they do not have any better indicators. But how can you get something which has not been set as target? Furthermore the steering culture is very much dependent on the personal opinions of person in charge in funding organisation. During our programme preparation the person has changed for three times and every time that has affected to the emphasis of our program. The former stressed completely different things than the current." (Representative of university A)

Also the timescale in steering was criticised by programs actors. Enhancement of systemic changes such as the emergence of user communities to support the acquisition of real time environmental data and developing concrete business solutions for environmental reporting standards is a complex and long term process. The timeline for these changes is much longer which can be captured by the current evaluation and steering mechanisms. Therefore the reported results do not tell the truth of the attained results. Like revealed in interviews current steering may direct to wrong conclusion of success of the programmes:

"Current indicator in steering may lead to the completely wrong conclusion of the success of the programs. They may even show that companies have not achieved anything in these programs. The reason for the wrong conclusion relates to the different time scales of steering and productisation in companies. Launching the new products is a long term process. Companies publish the information of new solutions when launching them. Problematic thing is that steering in funding organisation is based on targets which do not take into account different timescales. We have, for example, started several the product development processes based on the program results, but we won't tell about these results in public before we are launching the new products." (Representative of a large company D)

Current criteria are set top-down by funding organisation. Instead of top-down target setting programme actors are begging for better interaction with funders during the programme preparation and implementation. According to them it would be essential to have a shared vision created in the dialogue between top down and bottom up processes. In addition the operational environment is continuously evolving thus the targets and operations of the programs need to be adapted into the changes in operational environment. That also highlights the need for continuous interaction. Role of funders in the process should be a supportive and collaborative partner, not a controlling administrator. Like revealed in interviews, aspects to be considered in the vision building are the holistic understanding of the forthcoming environmental challenges and users' needs. Equally important is to identify both the most relevant actors and the central milestones required to realise the vision.

"Funding decisions are made currently in a very bureaucratic process and the selection of programs is based on completely wrong criteria. They are focusing too much formal structure of the proposal although the focus should be in visi-

onary targets: how we aim to enhance societal change in collaboration. The bureaucracy and control not enhance the good quality research, business impacts or industrial renewal in this country. On the contrary when we are aiming at radical and long term change the objectives should be defined in the collaboration of multiple actors including funding organisation. Together we should set targets and identify the steps to reach targets.” (Representative of large company E)

Interviewees believed that open interaction with funders would improve the program preparation. Currently the preparation processes are typically prolonged because of the bureaucracy, lasting in some programs even for five years. Un-effective preparation has led to fatigue of company partners and some of them have decided to opt out from the consortium. Loss of the central partners has led, like illustrated in citation below, to the absence of required competences:

“Preparation process of new programs is untenable. Long and hard preparation has led to the situation in which the company partners have decided to opt out of the project. Instead of refining the proposal in details the focus should absolutely be in setting long term visionary target and ensuring that we have the best actors in our partnership network” (Representative of University C)

Not only the poor evaluation criteria and interaction in governance, but also the consortium rules are limiting the agile collaboration and network formation. Current rules are inflexible and do not correspond with the modern way of development which is based on continuously evolving networks. However, current consortium rules necessities permanent participation and do not allow the evolvement of networks which may congeal programs activities. For example programs actors perceived the need to empower the citizens and residents’ associations into the development of energy solutions in ongoing programmes. However, integration of new actors during the programme period was not possible which complicated the program implementation and prevented the empowerment of citizens. In addition, in some companies, for example in start-ups and high growth companies the operations are fast and cycle, which are not recognized in the consortium rules. Thus their participation in the programs may be prevented by too strict consortium rules. Like the citation illustrates our interviews assume that more flexible consortium rules would facilitate company entry and participation in the programs.

“Consortium rules in programmes are problematic and prevent the flexible entry into and exit from the programs. More flexible rules would facilitate the small companies’ participation. Now the rules are old-fashioned and they do not support the cyclic and fast operations of start-ups and high growth enterprises in which the phases of research and commercialisation alternate flexible in the course of development process.” (Large company representative D)

Current consortium rules also constrain partners collaborate within national borders and hinders the collaboration with the foreign actors whose competences would be relevant in providing high level research and completely new solutions. Like interviews revealed the consortium rules should be renewed to support the collaboration with the relevant partners instead of being restricted on national borders:

“China has changed the criteria of innovation activities and they allow the R&D funding abroad. We should also renew our rules in Finland. The current rules restrict the collaboration with international partners which prevents the collaboration and co-production with the world leading partners and stagnates the national competence development. It is impossible to imagine that in Finland you can continuously find partners who are the world’s best in everything. When you try to collaborate in these programs with foreign researcher funding organisation says that we cannot pay the salary for researchers in Chinese universities. I do see why it is difficult to renew the rules; they are only afraid of nasty headings in newspapers that Finland is funding the R&D in China.” (Representative of small company B)

5. Concluding discussion

In this paper we have examined the collaborative forms of service innovations to tackle the system level challenges in environmental sector. To describe multi-actor collaboration we have applied the concept of ServPPIN (Gallouj et al, 2013). It concretize forms of such new governance approach in which the solutions to complex societal problems are based on the integration of technological and service based novelties, and which appreciate innovation as a democratic practice as well as partnerships, co-production and trust between multiple kinds of actors.

Innovation dynamics within an ServPPIN are result of complex interactions between various actors having heterogeneous competences and goals (Djellal and Gallouj, 2013). The perspective of social innovation is applied to create understanding of the participatory and networked processes without which it is not possible to create innovation in a multi-actor environment (see. Toivonen, 2015; Harrisson, 2011).

Our case study reflects in many ways the complex ServPPINs aiming to enhance systemic change in the area of energy and environment. It developes complex, architectural innovations (see Djellal & Gallouj, 2013) to promote the systemic change and industrial renewal in the sector for example by defining the “new architecture of the future energy system”. System renewal requires variety of technological and non-technological innovations; e.g. new patterns in production and consumption of energy. Besides new technologies, new services, business models and processes (in and between different levels of society) are developed.

Renewal and system level change is accelerated through new type of interaction and co-creation within multiple network partners. According to our results the empowerment of multiple actors representing variety of sectors, competences and world views is in essential role both in creating holistic understanding of the requirements of system level change and in developing solutions that correspond with these comprehensive needs. However in the collaboration the representatives of public and private sectors are dominating. Instead the broader understanding of citizens’ needs and societal aspects are lacking. That may hinder the acceptance of novel solutions and hamper the systemic change.

Development process on the complex innovations include formalised top down strategies and regulations. Like the results show the emergence of an open and collaborative culture is crucial to the development of such a network; the core is in informal

models of innovation by giving room systematic procedures of building trust. Organisational boundaries need to be opened up to facilitate the collaboration and integration of various competences and divergent goals. These characteristics of network imply the need for development of a different set of competences, resources, and expertise, as well as different modes of communication, coordination, and governance in the different level of system. Especially the formal steering mechanisms should be developed to understand the dynamic and long-term nature of systemic changes and to enable the complex development processes in networked world.

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G: Services and innovation in developing economies

G1: Service innovation in development countries

Chair: Andrew Berry

Sectoral engines of growth in developing countries: Are services a chance for catching-up?

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The sectoral composition of an economy matters for growth and development since sectors have different capabilities to induce productivity gains, promote the expansion of other sectors or benefit from demand growth. Our research hypothesis regards whether some specific service sectors may be a sectoral engine of growth in developing countries. Therefore, we revisit and re-estimate Kaldor's Growth Laws by taking into account seven economic sectors (including four service sub-sectors) across twenty-nine Asian, Latin American and Sub-Saharan African countries during 1975 and 2005.

1. Introduction

Research on the transformation of the productive structure of economies along the course of development is back in the spotlight. After the pioneer studies by Clark (1957), Kaldor (1966), Kuznets (1966) and Chenery and others (1986), there has been a renewed interest across developed countries (Jorgenson and Timmer, 2011) and, particularly, across developing economies (Timmer and de Vries, 2009; Bah, 2011; MacMillan and Rodrik, 2011; McMillan, et al., 2014; Timmer et al., 2014, Rodrik, 2015). Nevertheless, there is still a need for going deeper into the analysis of the dynamics of heterogeneous productive structures of developing economies and its impact on growth. Recent contributions “should be complemented by old ideas that have received little attention in contemporary debates, including the growth-productivity connections associated, in particular, with the Kaldorian tradition and the linkages among firms and sectors emphasized by Hirschman” (Ocampo, 2005, page 22).

The structure of an economy matters for growth performance and development since sectors have different capabilities to induce productivity gains, promote the expansion of other sectors or benefit from internal and external demand growth (Cimoli et al., 2005; Thirlwall, 2013). In the Kaldorian tradition, the manufacturing industry has traditionally been considered as the main vector of productivity growth over time and, thus, as an “engine of growth” of economies (Thirlwall, 1983). Kaldor (1966, 1967) proposed a set of long-run relationships between manufacturing growth, productivity growth and output growth that are commonly known as Kaldor's Growth Laws (from now on, KGL). In this structural approach there is a need to distinguish between increasing returns activities, on the one hand (associated with manufacturing), and diminishing returns activities with labour surplus, on the other (associated with agriculture). Manufacturing expansion can induce the growth of GDP per worker as a result

of two mechanisms. First, productivity in manufacturing rises with the growth of manufacturing output due to the presence of increasing returns to scale at the sector level. Second, output growth in manufacturing tends to increase the rate of productivity growth in other sectors. Therefore, industrialization has been seen as a pathway to output growth and, ultimately, economic development.

These old ideas on the pivotal role played by manufacturing in growth via productivity are now being challenged by new evidence. First, several developing economies are experiencing “premature deindustrialization” as documented by Palma (2005); Dasgupta and Singh (2005, 2006) and Rodrik (2015). In these countries, the share of manufacturing in employment and value added is shrinking at levels of income per capita that are much lower of those at which the advanced nations historically began to de-industrialize. Thus, many developing countries are becoming service-based societies faster than what are now developed countries did during their transition through development stages (Bah, 2011; Ghani and Kharas, 2010; Ghani et al., 2012; Szirmai, 2012). Second, the tradability of services has progressively increased and value chains of production have now globally expanded. This means that the advantages that manufacturing and agriculture traditionally had on the trade/globalization sphere are now eroding (Dasgupta and Singh, 2005). Moreover, the increased interdependence of countries implies that an integrative and comparative view of structural change is much more relevant than a closed economy view (Matsuyama, 2009). Third, some service sub-sectors have completely broken away old myths and have turned into some of the most innovative and productive activities. Productivity improvements in market services (namely, in financial and computer and related services or business services) are as important as, or even more important than, productivity growth in manufacturing (Timmer and de Vries, 2007; Timmer and de Vries, 2009; Maroto-Sánchez and Cuadrado-Roura, 2009, United Nations, 2009). At the same time, after the financial crisis, the political and academic discussion is going towards the “reindustrialisation” of (developed and developing) countries and the fostering of industrial policies as a means to achieve sustainable growth paths (Tregenna, 2011; Westkämper, 2014).

Facing the old ideas with the new evidence, our research hypothesis regards whether some specific service sectors may be a source of economic growth in developing countries. Potentially, those services embodying knowledge and technology or with strong inter-industry linkages or highly tradable may serve as a means to catching-up with advance economies by complementing/replacing manufacturing as an additional/new engine of growth. This may happen by the same productivity-growth connections that Kaldor uncovered for the manufacturing sector. Therefore, we aim to revisit KGL and econometrically test them in seven economic sectors (including four service sub-sectors) across twenty-nine developing countries from Asia, Latin America and Sub-Saharan Africa during a time span of three decades (1975-2005). Panel data estimations are complemented with a decomposition of labour productivity growth in order to study how resource reallocation during the process of structural change affects economic growth in those developing economies.

We contribute to the literature in this field by taking into account the heterogeneity of services when examining growth across developing economies within a Kaldorian framework. To our knowledge, no study has tested KGL across developing countries and at the (two-digit) disaggregated level of the services sector. Moreover, this research aims to uncover how the heterogeneous productive structures of the different sub-continent have an impact on growth. Furthermore, whether services-led growth

can become a new growth model in the absence of sizable manufacturing industries is a matter of concern (Rodrik, 2015). This timely investigation aims at contributing to this debate.

The paper is structured in the following way. Section 2 explains KGL and summarizes the related literature. Section 3 presents the data used in this research and the empirical strategy followed. The econometric results for the whole sample of countries as well as for the different sub-continent and the decomposition of labour productivity growth are discussed in Section 4. Finally, conclusions and the future research path are presented.

2. The Kaldorian Framework

Nicholas Kaldor (1966, 1967) attempts to explain large growth rates differences between industrialized countries after the postwar by adopting a sectoral approach where dualisms à la Lewis can be found (Lewis, 1954). Unlike the neoclassical theory of economic growth, which is based on a homogeneous product of the economy and is entirely supply-driven, Kaldor argues that both the production and demand characteristics of each sector of the economy (agriculture, industry and services) matter for economic growth. On the demand side, the income elasticity of manufacturing is similar to that of services but higher than that of agriculture. On the supply side, a low productivity agricultural sector with labour surplus subject to diminishing returns coexists with a capital-intensive manufacturing sector characterized by increasing returns and high productivity growth. At the same time, Kaldor considers that the productivity growth in services tended to be considerably lower than that of manufacturing. Manufacturing showed greater potential for productivity growth than other sectors due to the presence of static economies of scale and of dynamic economies of scale in their production. Static economies of scale are mainly technical, internal to the firm and related to mass production. Dynamic economies of scale refer to increasing productivity derived from “learning by doing” (Arrow, 1962) and from the macroeconomic spillover effects of the expansion of manufacturing activities (induced technological change, externalities in the production, etc.), the so-called “macroeconomic of scale” in the sense of Young (1928).

Considering these conditions, the reallocation of labour from unproductive activities (agriculture) to more productive sectors (like manufacturing) fosters productivity growth in both sectors and depends on the demand derived from manufacturing expansion. Unlike neoclassical economist, Kaldor believes that manufacturing growth is not resource-constrained (mainly by labour) but rather demand-determined. While in the first stages of development, the expansion of this key sector is closely related to the demand of the dominant agricultural sector, in later stages is mainly driven by external demand or export growth. This is explained by the higher tradability of manufactures and the higher income elasticity of demand (Dixon and Thirlwall, 1975). In this respect, manufacturing also has greater potential than other sectors for releasing balance of payment constraints. A virtuous circle of cumulative growth can be explained on the basis of external demand evolution (Kaldor, 1970; Dixon and Thirlwall, 1975). As exports grow, output increases lead to fast productivity growth (by the presence of dynamic economies of scale) which induces an increase in competitiveness that leads to an additional increase in exports.

In the view of these stylized facts, Kaldor articulates a set of long run relationships or empirical generalizations concerning the growth of output, employment and productivity at the sectoral level of the economy which latter came to be known as Kaldor's Growth Laws (KGL). According to these laws, there is a close association between the industrial activity of a country (in particular, manufacturing) and overall output growth, and, therefore, manufacturing can be conceived as an "engine of growth" (Thirlwall, 1983).

3.1 Kaldor's First Law

The first law states that the faster the growth of manufacturing output (q_m) in an economy, the faster the growth of gross domestic product (q_{GDP}). Kaldor fundamentally defines a causal relationship running from sectoral growth to overall growth and more precisely from manufacturing growth to the growth rate of GDP per worker (Ros, 2000). This is the result of two mechanisms that are reflected in Kaldor's second and third laws. Following Thirlwall (2013), we can posit the first law as:

$$q_{GDP} = f_1(q_m) \quad f'_1 > 0 \quad (\text{Equation I-A})$$

According to Thirlwall (2003) and Wells and Thirlwall (2003), there are two additional regressions that overcome the problem of spurious correlation that is evidently present in Equation I-A (since by definition total output growth is the weighted sum of sectoral output growth).

$$q_{GDP} = f_1(q_m - q_{nm}) \quad f'_1 > 0 \quad (\text{Equation I-B})$$

$$q_{nm} = f_1(q_m) \quad f'_1 > 0 \quad (\text{Equation I-C})$$

In equation (I-B) the growth of GDP (q_{GDP}) is regressed on the excess of the growth of manufacturing production (q_m) relative to the growth on non-manufacturing production (q_{nm}). In equation (I-C), the growth of non-manufacturing output is regressed on the growth of manufacturing output, and the estimated coefficient would indicate the strength and size of the impact of manufacturing sector growth on the rest of the economy.

In order to consider manufacturing industry as an engine of growth we need to carry out the same exercise for the other sectors of the economy and show that there is no significant relationship between GDP growth and the growth of agriculture or services. While it is hard to find significant relationships between GDP growth and the growth of the agricultural sector, the relationship of the former with services growth is generally strong (Thirlwall, 2003 and 2013). Despite it is likely that for certain service activities such as transport or retailing, depending to a large extent on manufacturing growth, the direction of causality is in the inverse sense; other services (IT related, in particular) seem to be leading the expansion of manufacturing, rather than the other way round (Dasgupta and Sing, 2005). Two questions remain open in this respect: to what extent do services activities have production characteristics (e.g. static and dynamic scale economies) that induce fast growth (Thirlwall, 2003), and to what extent do services have an independent existence apart from manufacturing (Thirlwall, 2013).

3.2 Kaldor's Second Law

The second law states that the faster the growth of manufacturing output (q_m), the faster will be the growth of productivity in manufacturing (p_m) as a result of increasing returns to scale. This first mechanism explaining causality from manufacturing growth to GDP per worker growth is known as the Verdoorn's law –named after the Dutch economist P.J. Verdoorn who found a strong empirical relationship between productivity and output growth in a cross section of countries in the 1940s.

This law can also be interpreted from the perspective of employment growth in manufacturing (e_m): the higher the scale economies of the sector, the lower the employment elasticity with respect to output as productivity grows as a result of output expansion. This means that output expansion induces a less than proportional employment creation that causes productivity gains.

$$e_m = f_2(q_m) \quad f'_2 > 0 \quad (\text{Equation II})$$

Kaldor (1966) specified the Verdoorn relation in terms of a linear regression model: $e_m = \beta_0 + \beta_1 q_m$ with $\beta_1 > 0$ being an indicator of increasing returns of scale (the Verdoorn coefficient). However, due to the productivity identity, this can be expressed as: $e_m = -\beta_0 + (1-\beta_1) q_m$ with $0 < \beta_1 < 1$ being $(1-\beta_1)$ the elasticity of employment with respect to output growth.

Verdoorn law itself has been subject to extensive debate and thus generated a large body of empirical and theoretical literature. For the purposes of this paper, several issues concerning the specification and interpretation of the law have to be pointed out. In the first place, Kaldor preferred the specification in terms of employment in order to avoid the problem of identification or spurious relation. Secondly, he states that for the existence of static or dynamic economies of scale in industry, "a sufficient condition is the existence of a statistically significant relationship between e and g , with a regression coefficient which is significantly less than unity" (Kaldor, 1975, p. 893; emphasis in the original). When analyzing cross-country data at sectoral level for 12 advanced economies between 1950s-1960s, he found a Verdoorn coefficient for manufacturing of 0.5, which has been confirmed by later studies. This coefficient means that 1% increase in output requires a 0.5% raise in labour and is associated with 0.5% increase in the growth rate of productivity. Kaldor's interpretation is that the Verdoorn law is a dynamic relationship based on the learning-by-doing concept: output expansion promotes human capital specialization and technological progress that fosters labour productivity. In the third place, in the Kaldorian tradition economic growth is determined by demand and not constrained by supply and thus it is the manufacturing output growth the exogenous variable determining productivity and employment growth. This is the reason why Kaldor rejected alternative formulations of the Verdoorn law such as the one proposed by Rowthorn (1975) which used employment growth as the regressor on productivity growth. Rowthorn finally accepted the validity of Kaldor's argument in the presence of labour surplus in the economy. For the case of developing economies, the problems of labour shortage pointed out by Rowthorn do not seem to apply due to their large informal sectors and the significant amount of underemployed or unemployed labour force that could be potentially transferred to manufacturing as the sector grows. An additional related issue is that of simultaneity or reverse causation from employment to output which may lead to estimations subject to simultaneous equation bias, as pointed out by McCombie (1983).

Another extensive debate in the literature has concentrated on the fact that the specification of Verdoorn law made by Kaldor does not control for the contribution of the capital stock growth (Bairam, 1987). If some sort of technical progress function underlies the law, as Kaldor suggested, then excluding this variable from estimations is likely to provide a biased coefficient of returns to scale except if a constant capital/output ratio is supposed (McCombie, 1982). In fact, some studies have included a variable accounting for the expansion of capital when estimating the Verdoorn law (León-Ledesma, 2000; Libanio, 2006). However, for the case of developing economies is very difficult to find reliable and consistent data of capital stocks at sectoral level, as also noted by Jaumotte and Spatafora (2007) and Wells and Thirlwall (2003). An additional problem of Kaldor's specification of Verdoorn's law concerns the measurement errors of the exogenous variables, an issue particularly relevant for the case of services output.

Moreover, in order to avoid a spurious estimation of the Verdoorn relation countries included in the sample should have an uniform technical progress diffusion, or the same rate of "exogenous" productivity growth (i.e., not induced by output growth). This imposes an additional challenge in the empirical estimation of the law. If technical progress diffusion varies across countries, then manufacturing productivity increase in laggards' countries may reflect the receipt of technical progress from leading countries, rather than increasing returns of scale. To avoid this problem, different alternatives are proposed in Verdoorn related literature: (i) the use of additional variables to account for the level of technological development, (ii) the analysis of individual countries using time series data, (iii) the use of cross-regional data, assuming that this minimizes the level of disparities in terms of level of technology.

3.3 Kaldor's Third Law

The third law states that employment growth in manufacturing tends to increase the rate of productivity in other sectors as a result of diminishing returns to labour in other sectors and the absorption of surplus labour from these sectors. This is the second mechanism explaining causality from manufacturing growth to GDP per worker growth. Unlike neoclassical economist, Kaldor considers there is disguised unemployment in agriculture rather than assuming that all resources are efficiently employed. This is the reason why the reallocation of labour from agriculture into manufacturing does not reduce agricultural output and, as a result of employment withdrawn productivity is increased. In other words, as employment declines in the non-manufacturing sector overall productivity growth raises.

Most empirical studies focusing on developing economies (Hansen and Zhang, 1996, Dasgupta and Singh, 2005 and 2006; Wells and Thirlwall, 2003) estimate this law by regressing overall productivity growth (p) on the growth on non-manufacturing employment (e_{nm}), controlling for the growth of manufacturing output (q_m) which according to Verdoorn's law induces productivity growth. A linear specification would be:

$$p = \beta_0 + \beta_1 e_{nm} + \beta_2 q_m \quad (\text{Equation III}), \text{ with } \beta_1 < 0; \beta_2 > 0$$

However, most empirical estimates of the third law suffer from spurious correlation and identification problems. Alternatively, growth accounting can be a useful approach for analyzing the relationships underlying Kaldor's Third Law. In particular, a

shift-share analysis would allow us to understand the role played by both labour reallocation between industries and by productivity differentials in overall productivity growth (Felipe et al., 2009).

3.4 Evidence on KGL: a review of the literature

Kaldor confirmed that manufacturing was an engine of growth for 12 OECD countries using cross sectional data over 1953 to 1964. Since then several other studies have examined the interpretation and the validity of the different laws across developed countries (Cripps and Tarling, 1973; Rowthorn, 1975; Parikh, 1978; McCombie, 1983; Michl, 1985); across regions within countries (McCombie and de Ridder, 1984, Hansen and Zhang, 1996; León-Ledesma, 2000); for individual countries (Stoneman, 1979; Bairam, 1991; Atesoglu, 1993); across regions across countries (Pons-Novell and Viladecans-Marsal, 1999, for European regions); across industries in the Verdoorn law (McCombie, 1985, Pieper 2003).

Some studies also argue that manufacturing is an engine of growth in developing economies based on estimation of KGL. Table 1 summarizes such studies and details their country sample, their time horizon, the equations estimated in the empirical exercise and the level of sectoral disaggregation adopted. Felipe (1998) finds evidence across five Southeast Asian countries and Wells and Thirlwall (2003) across forty-five African countries. In case of Latin American economies, evidence of increasing returns to scale in industrial sectors are found by Cimoli et al. (2005) and Libano (2006). Pacheco and Thirlwall (2014) consider the role played by exports growth in open developing economies and conclude that there is a strong association between exports and economic growth.

In contrast, very few studies argue that services may also serve as a means for catching-up in developing economies. Dasgupta and Singh (2005; 2006) are the first ones to argue within a Kaldorian framework that although manufacturing continues to be critical for development, services can also be regarded as an additional engine of growth. In particular, they emphasize the role played by ICT related services in the context of India. Services also have productivity growth inducing effects through the exploitations of scale economies in developing Asia -although to a lesser extent than manufacturing- as discussed by Felipe et al. (2009). Notwithstanding the productive heterogeneity of the region, they emphasize that the composition of services matters for determining the sustainability of their contribution to productivity growth.

As shown in Table 1, only half of the studies have carried out estimations of KGL for manufacturing but also for agriculture and services (the one-digit aggregation level of the International Standard Industry Classification, ISIC). However, all the studies have failed to deal with the heterogeneity of the service sectors in developing economies at two-digit level of ISIC. A notable exception is Pieper (2003) who examines the Verdoorn's law across 30 developing economies covering nine sectors. Strong evidence of increasing returns to scale is found for linear and non-linear specification of the law, with manufacturing and public utilities ranking the highest Verdoorn coefficients. This finding is relevant since it suggests that services may be subject to increasing results and that the same Kaldorian mechanisms that make manufacturing the engine of growth may also apply to these activities. Our paper examines this possibility and, therefore, fills a gap in the current literature by exploring the role

played by service subsectors in economic performance across Asian, Latin American and African developing economies.

Table 1. KGL in developing economies: a summary of the literature.

Paper	N	T	Equations estimated			Estimations at one digit level of ISIC aggregation?	Estimations at two digit level of ISIC aggregation?
			1st law	2nd law (Verdoorn's law)	3rd law		
Felipe (1998)	5 Asian countries	1967-1992	$q_{nm} = a_2 + b_2(q_m) + \varepsilon_2$	N.E.	N.E.	No	No
Pieper (2001)	30 developing countries	1970-1990	N.E.	$e_m = a_1 + b_1(q_m) + \varepsilon_1$	N.E.	Yes	Yes
Wells and Thirwall (2003)	45 African countries	1980-1996	$q_{GDP} = a_1 + b_1(q_m) + \varepsilon_1$ $q_{GDP} = a_2 + b_2(q_m - q_{nm}) + \varepsilon_2$ $q_{nm} = a_3 + b_3(q_m) + \varepsilon_3$	$e_m = a_1 + b_1(q_m) + \varepsilon_1$	$p = a_1 + b_1(q_m) + c_1(e_{nm}) + \varepsilon_1$	Yes	No
Cimoli et al (2005)	5 Latin American countries	1970-2000	N.E.	$e_m = a_1 + b_1(q_m) + \varepsilon_1$	N.E.	No	No
Dasgupta and Singh (2005)	30 developing economies	1980, 1990, 2000	$\log q_{GDP} = a_1 + b_1(\log q_m) + \varepsilon_1$	$\log(p) = a_1 + b_1(\log q_m) + c_1(\log e_{nm}) + \varepsilon_1$		Yes	No
Dasgupta and Singh (2006)	48 developing countries	1990-2000	$q_{GDP} = a_1 + b_1(q_m) + \varepsilon_1$	$p = a_1 + b_1(q_m) + c_1(e_{nm}) + \varepsilon_1$		Yes	No
Libanio (2006)	7 Latin American countries	1985-2001	$q_{GDP} = a_1 + b_1(q_m) + \varepsilon_1$ $q_{GDP} = a_2 + b_2(q_m - q_{nm}) + \varepsilon_2$ $q_{nm} = a_3 + b_3(q_m) + \varepsilon_3$	$e_m = a_1 + b_1(q_m) + c_1(k_m) + \varepsilon_1$	N.E.	No	No
Felipe et al (2009)	17 Asian countries	1980-2004	$\ln q_{nm} = a_3 + b_3(\ln q_m) + \varepsilon_3$	$\ln e_m = a_1 + b_1(\ln q_m) + \varepsilon_1$	Decomposition of labour productivity growth	Yes	No
Pacheco and Thirwall (2013)	89 developing countries	1990-2011	$q_{GDP} = a_1 + b_1(q_{EXP}) + \varepsilon_1$ $q_{EXP} = a_2 + b_2(q_m) + \varepsilon_2$ $q_{GDP} = a_1 + a_2 b_1 + b_1 b_2(q_m) + \varepsilon_3$	N.E.	N.E.	No	No

Notes: N.E. for not estimated.

3. Data and empirical strategy

The empirical strategy followed in this research is double. On the one hand, we use panel data analysis to estimate Kaldor's first and second laws (equations I-A, I-B, I-C and II). Regressions are performed by sector panel, first, for the whole sample of developing countries and, then, for the different sub-continent. On the other hand, instead of econometrically estimating Kaldor's third law, we perform a decomposition of labour productivity growth. This is a more successful approach as traditional estimates of this law suffer from spurious correlation and identification problems (Felipe et al., 2009). On the basis of both empirical analyses we would be able to determine whether some specific service sector may be a source of economic growth in developing economies.

The main source of the sectoral evidence applied in this research is the Groningen Growth and Development Centre (GGDC) 10-Sector Database (Timmer and de Vries, 2007) and the Africa Sector Database (de Vries et al., 2013). These are first databases that provide long-term series at the at the two-digit level of the ISIC codes for developing economies. While other data sources also collect sectoral data and make it publicly available (e.g. the World Bank, the United Nations or the International Labour Office), the series provided "are often short (starting only in the 1980s or 90s), not consistent over time and across countries, and have little sectoral detail" (Timmer and de Vries, 2007, page 3). GGDC 10-Sector Database and Africa Sector Database extend over more than five decades and compute yearly data on value added (in current and constant prices - expressed in national currencies), and employment. At this point in time, they probably represent the best time-series data available for developing countries due to its unique sector disaggregation which covers the entire economy.

The econometric analysis of KGL is conducted using a balanced sectoral panel of 29 developing countries with available information for 1975-2005. Our country sample includes nine countries from Latin America (Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Mexico, Peru, and Venezuela), nine countries from Asia (Hong Kong (China), India, Indonesia, Rep. of Korea, Malaysia, Philippines, Singapore, Taiwan, Thailand) and eleven countries from Africa (Botswana, Ethiopia, Ghana, Kenya, Malawi, Mauritius, Nigeria, Senegal, South Africa, Tanzania, Zambia). The econometric estimations are performed, first, for the whole sample of developing countries and, then, for the different sub-continent. In this way, we are able to account for differences across developing regions and to reduce the level of disparities in terms of level of technology.

As regards the time span of the econometric study, the year 1975 was chosen as a starting point for the practical reason that data for the whole sample of countries is available from that time. Moreover, following Pieper (2003) and León-Ledesma (2000), we use a moving average of value added at constant prices, employment and productivity growth rates (taking 5 years averages) to smooth out short-term fluctuations present in the annual data. As a result, we avoid the problem of conflating the long-run Verdoorn law with the short-term cyclical relationships described by Okun's law.

Time series available in the GGDC Database are broken down into the ten main sectors detailed in Table 2. Since for several countries there is no distinction between value added or employment (or both) in the “Producers of Government Services” sector and the “Community, Social, and Personal Services” sector, we aggregate data for these activities into a single sector (as McMillan and Rodrik, 2011 and McMillan et al., 2014). In addition, a series for the value added and employment of the whole services sector (sectors G to Q) are also included in the analysis. All in all, our econometric exercise is performed for seven sectors: 1) manufacturing; 2) agriculture; 3) total services; 4) commerce (distributive trades and tourism); 5) transport and communications, 6) business services (finance, insurance, real estate and business activities); 7) public services (community, social, personal and government Services).

Table 2. Description of sectoral composition of GGDC database

		ISIC rev. 3 SNA 1993	ISIC rev. 3 SNA 1993
1	Agriculture, hunting, forestry and fishing	Division 01-05	A+B
2	Mining and quarrying	Division 10-14	C
3	Manufacturing	Division 15-37	D
4	Electricity, gas, water	Division 40-41	E
5	Construction	Division 45	F
6	Wholesale and retail trade, restaurants and hotels	Division 50-55	G+H
7	Transport, storage and communication	Division 60-64	I
8	Finance, insurance, real estate and business services	Division 65-74	J+K
9	Community, social and personal services (a)	Division 75-99	O+P+Q
10	Producers of government services (a)	Division 75-99	L+M+N

Notes: (a) As ISIC is a classification according to kind of economic activity, and does not draw distinctions according to kind of ownership, type of legal organisation or mode of operation, no clear distinction in terms of divisions can be made for these sectors. Source: Timmer and de Vries (2007, page 3).

In the econometric analysis, data for the seven sectors is pooled, first, for the 29 country time series so that every sector panel ends up having 174 observations based on five-year growth rates. Every sector panel for the nine Asian and Latin American countries included in the sample has 54 observations, while for the eleven Sub-Saharan African economies each sector panel has 66 observations. Outliers are detected and treated using one dummy variable for each. Fix country effects are added in order to deal with omitted heterogeneity. Equations are estimated by OLS with Panel Corrected Standard Error Estimations (PCSE) accounting for groupwise heteroskedasticity, cross sectional dependence and autocorrelation in disturbances within panels.

The following are the linear specifications estimated for examining Kaldor’s First Law at sectoral level:

$$q_{GDP_{it}} = \alpha_{1j} + \beta_{1j} q_{jit} + \varepsilon_{jit}$$

Equation I-A

$$q_{GDP_{it}} = \alpha_{2j} + \beta_{2j}(q_{jit} - q_{njit}) + \varepsilon_{jit} \quad \text{Equation I-B}$$

$$q_{njit} = \alpha_{3j} + \beta_{3j}q_{jit} + \varepsilon_{jit} \quad \text{Equation I-C}$$

where j , i , t stand for sector, country and time, respectively, and ε_{jit} is assumed to be normally distributed. q_{GDP} represents total output growth (the growth of total value added in constant prices) and q_{jit} is the sectoral output growth (the growth sectoral value added in constant prices).

The specification of Kaldor's Second Law is as follows:

$$e_{jit} = \alpha_{1j} + \beta_{1j}q_{jit} + \varepsilon_{jit} \quad \text{Equation II}$$

where j , i , t stand for sector, country and time, respectively, and ε_{jit} is assumed to be normally distributed. e_{jit} is the sectoral employment growth and q_{jit} is the sectoral output growth.

4. Empirical findings

4.1 Kaldor's First Law: Estimation Results

Our evidence confirms the validity of Kaldor's First Law across the whole sample of developing economies. As in Dasgupta and Singh (2005 and 2006), manufacturing growth seems to be a driving force behind overall growth across developing countries. Table 3 shows that the estimated coefficients are significant and follow the expected sign in equation I-A and the corresponding side tests (equation I-B and I-C). In order to establish that manufacturing is the engine of growth, it is necessary to perform estimations for the agriculture and the service sub-sectors as well and to compare the respective outcomes. Sectoral growth is strongly associated with overall growth, as shown by the estimations of equation I-A. However, spuriousness seems to be a problem in total services, commerce and transport and communications since these sectors do not pass the first side test of the law. When the side test is performed relating overall growth to the excess of agricultural growth over the non-agricultural growth, the regression coefficient is significant but negative. The same result is found for the case of public services. However, one service sub-sectors pass both side tests of the law: business services. This may reflect changes in inter-industry linkages as result of the increase of services as intermediate inputs for the rest of the economy. Business services are generally used as intermediate inputs and thus have important forward and backward inter-industry linkages; apart from embodying and enabling the use of new technology. Including financial services and business activities (R&D, computer services, and other business activities), this sub-sector behaved like manufacturing as an engine of growth in the whole set of developing economies considered in our analysis. Some authors have already argued that

business activities have directly and indirectly contributed economic growth in developed countries, like the European ones (Kox and Rubalcaba, 2007).

Table 3. Panel data estimation of Kaldor's First Law: all developing countries

SECTOR	EQUATION I-A		EQUATION I-B		EQUATION I-C	
	α_{1j} / s.e.	β_{1j} / s.e.	α_{2j} / s.e.	β_{2j} / s.e.	α_{3j} / s.e.	β_{3j} / s.e.
j=manufacturing	.0125*	.4682***	.0173	.1461*	.0160*	.3626***
	.0053	.0249	.0094	.0612	.0065	.0329
	R2	0.781	R2	0.4687	R2	0.637
j=agriculture	.0107	.2371***	.0170*	-.3027***	.0124	.1343*
	.0088	.0531	.0068	.0477	.0092	.0601
	R2	0.516	R2	0.605	R2	0.522
j=services	.0008	.8411***	.0161	-.1328	.0002	.7170**
	.0031	.0346	.0090	.0769	.0070	.0682
	R2	0.895	R2	0.461	R2	0.664
j=commerce	.0101**	.5414***	.0158	.0464	.0122**	.4671***
	.0033	.0412	.0093	.0573	.0036	.0458
	R2	0.785	R2	0.451	R2	0.705
j=transport and communications	.0007	.4264***	.0150	.0220	.00001	.3934***
	.0059	.0493	.0095	.0752	.0062	.0518
	R2	0.703	R2	0.448	R2	0.649
j=business services	.0066	.3373***	.0137	.1536***	.0076	.2694***
	.0084	.0263	.0090	.0415	.0082	.0237
	R2	0.727	R2	0.527	R2	0.653
j=public services	.0094	.3833***	.0157*	-.370***	.0112	.2650**
	.0083	.0844	.0063	.0455	.0107	.1012
	R2	0.515	R2	0.599	R2	0.420
N	174		174		174	

Note. OLS estimations with fixed effects and Panel Corrected Standard Errors accounting for group-wise heteroskedasticity, cross sectional dependence and serial correlation. Dummy coefficients estimates are available on request. Legend: s.e. for standar deviation; * p<0.05; ** p<0.01; *** p<0.001

Kaldor's First Law is also confirmed for the sub-continent under analysis, as shown in Tables 4 (i) to (iii). This finding is in line with Wells and Thirlwall (2003) for 45 African economies; Libano (2006) for 7 Latin American economies; and Felipe et al. (2009) for 17 Asian countries. The impact of manufacturing on growth seems to be more important for Latin America than for Asia or Africa. No relationship between the expansion of agriculture and overall growth is found in Asia, whereas in Latin America and Africa the excess of agricultural growth over the non-agricultural growth impacts negatively on overall growth, as in the aggregate country sample. This result is also found for the case of public services in the three different sub-continent. Business services seem to drive overall growth in Asia and Latin America but no evidence is found across African economies. This may be related to the undersized manufacturing basis attained by this region which hampers the development of many related business services. In fact, when the side test is performed relating overall growth to the excess of business services growth over the non-business services growth; the regression coefficient is significant and negative. The impact of business services on growth seems to be more important for Asia than for Latin America. This may reflect that Asian countries have larger participation of manufacturing activities in the economy than their Latin counterparts.

Table 4. Panel data estimation of Kaldor's First Law

(i) Asia

SECTOR	EQUATION I-A		EQUATION I-B		EQUATION I-C	
	$\alpha_{1j}/\text{s.e.}$	$\beta_{1j}/\text{s.e.}$	$\alpha_{2j}/\text{s.e.}$	$\beta_{2j}/\text{s.e.}$	$\alpha_{3j}/\text{s.e.}$	$\beta_{3j}/\text{s.e.}$
j=manufacturing	.0276***	.4626***	.0710**	.2400*	.0537***	.3617***
	.0039	.0523	.00611	.1007	.0043	.0590
	R2	0.715	R2	0.292	R2	0.520
j=agriculture	.0712***	.1622*	.0431*	-.1708	.0719***	.162
	.0080	.0805	.0166	.1019	.0080	.0848
	R2	0.357	R2	0.285	R2	0.305
j=services	.0021	.9223***	.0683	-.244	-.0036	.9095***
	.0038	.0416	.00	.1358	.0137	.0864
	R2	0.920	R2	0.245	R2	0.747
j=commerce	.012*	.6755***	.0570***	.3763	.0134	.6102***
	.0056	.0444	.009	.209	.00762	.0551
	R2	0.859	R2	0.351	R2	0.784
j=transport and communications	.019*	.548***	.0610***	-.2399**	.02143*	.5108***
	.0077	.0977	.0054	.0919	.0084	.107
	R2	0.623	R2	0.352	R2	0.571
j=business services	.0404***	.3097***	.058***	.2999***	.0408***	.2578***
	.0051	.0267	.0070	.04819	.0064	.0274
	R2	0.750	R2	0.521	R2	0.649
j=public services	.0362*	.5048**	-.5147***	-.5147***	.044*	.397
	.0150	.1929	.1132	.1132	.01876	.2341
	R2	0.362	R2	0.504	R2	0.277
N	54		54		54	

(ii) Latin America

SECTOR	EQUATION I-A		EQUATION I-B		EQUATION I-C	
	$\alpha_{1j}/\text{s.e.}$	$\beta_{1j}/\text{s.e.}$	$\alpha_{2j}/\text{s.e.}$	$\beta_{2j}/\text{s.e.}$	$\alpha_{3j}/\text{s.e.}$	$\beta_{3j}/\text{s.e.}$
j=manufacturing	.0114**	.6353***	.020*	.3848***	.0148***	.5564***
	.0043	.0551	.0097	.1323	.0054	.0653
	R2	0.823	R2	0.422	R2	0.723
j=agriculture	.0031	.612***	.0190***	-.6878***	-.0014	.821***
	.0090	.2121	.0051	.0857	.0089	.196
	R2	0.323	R2	0.659	R2	0.438
j=services	-.0002	.8998***	.0156	-.0420	-.0006	.7681***
	.00288	.0454	.0083	.1583	.00690	.0918
	R2	0.916	R2	0.217	R2	0.6538
j=commerce	.0101**	.5420***	.01674*	.1860	.01245**	.4503***
	.0033	.0585	.00833	.1124	.0038	.0700
	R2	0.720	R2	0.239	R2	0.571
j=transport and communications	-.0062	.6304***	.01247	.1466	-.0004	.6007***
	.0046	.0509	.0098	.1278	.0034	.0637
	R2	0.796	R2	0.207	R2	0.756
j=business services	.0068	.3292***	.0137	.1277*	.0088	.2349***
	.0083	.0452	.0083	.0561	.0085	.0479
	R2	0.588	R2	0.381	R2	0.4017
j=public services	.0055	.6264***	.0157**	-.5235***	.0069	.5352***
	.0076	.1192	.0051	.0758	.0101	.1517
	R2	0.476	R2	0.522	R2	0.358
N	54		54		54	

(iii) Africa

SECTOR	EQUATION I-A		EQUATION I-B		EQUATION I-C	
	$\alpha_{1j}/\text{s.e.}$	$\beta_{1j}/\text{s.e.}$	$\alpha_{2j}/\text{s.e.}$	$\beta_{2j}/\text{s.e.}$	$\alpha_{3j}/\text{s.e.}$	$\beta_{3j}/\text{s.e.}$
j=manufacturing	.0435***	.327***	.0571***	.1364*	.0479***	.2583***
	.00798	.0547	.00992	.06506	.0084	.0567
	R2	0.626	R2	0.586	R2	0.575
j=agriculture	.06175***	.2370***	.0553	-.150***	.0658***	.0103
	.0105	.0636	.01314	.0575	.0124	.0612
	R2	0.515	R2	0.397	R2	0.495
j=services	.0041	.7074***	.04936***	-.2532***	.0098	.4857**
	.0107	.0818	.0038	.0769	.0166	.1291
	R2	0.729	R2	0.542	R2	0.437
j=commerce	.0128*	.4545***	.0629***	-.00883	.024728*	.3944***
	.0064664	.0474	.0110	.0673	.0126	.0711
	R2	0.793	R2	0.412	R2	0.625
j=transport and communications	.0313**	.2993***	.0586	.1035	.0339**	.2641***
	.0093	.0593	.0111	.09725	.0098	.0608
	R2	0.640	R2	0.431	R2	0.597
j=business services	.03506***	.4520***	.05445	-.2164*	.03842***	.3959***
	.00991	.0760	.00725	.1088	.0108	.0817
	R2	0.641	R2	0.558	R2	0.580
j=public services	.0429***	.2259**	.0582***	-.2625***	.0501	.0907
	.01063	.0895	.0083	.0693	.0126	.1033
	R2	0.471	R2	0.571	R2	0.3802
N	66		66		66	

Note. OLS estimations with fixed effects and Panel Corrected Standard Errors accounting for group-wise heteroskedasticity, cross sectional dependence and serial correlation. Dummy coefficients estimates are available on request. Legend: s.e. for standar deviation; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

4.2 Kaldor's Second Law: Estimation Results

The second law is also confirmed for the whole sample of developing economies: there are increasing returns to scale in manufacturing activities. Table 5 reports panel data estimations for equation II and provides one-tailed test hyphotesis of constant returns to scale ($\beta_{1j} = 1$) and increasing returns to scale ($\beta_{1j} < 1$) at the sector level. All sectors –with the exception of agriculture and commerce– show employment elasticities with respect to output growth that are significantly positively and less than unity. In five out of seven sectors we can reject the constant returns hypothesis at the 10 percent confidence interval for one-tailed tests. Moreover, in these sectors estimates of the employment elasticity with respect to output growth are significantly less than unity. These statistics suggests strong evidence for increasing returns at the sector level of developing economies (as in Pieper, 2003).

There is evidence for IRS in manufacturing in both Asia and Africa. Asian manufacturing output has turned into more technology- and scale-intensive subsectors (Jau-motte and Spatafora, 2007; Felipe and Estrada, 2007; ADB, 2007). But, African manufacturing sectors are characterized by a declining diversity and sophistication (Page, 2011).

We find no evidence for IRS in manufacturing in Latin American economies. Manufacturing output has turned into natural resources intensive sectors (paper, tobacco, etc.) in many Latin American countries (Cimoli et al., 2005).

In Latin America we found no relationship between sectoral output growth and employment growth at the sectoral level, except for business services. In the Kaldorian framework this lack of relationship is explained by the existence of disguised unemployment. This may reflect the high levels of informality in Latin America that hinders productivity growth in services (Pagés, 2012)

There is evidence for IRS in business services in both Asia and Latin America. In Africa we cannot reject the null hypothesis of constant returns to scale at the 5% of significance level.

Table 5. Panel data estimation of Kaldor's Second Law: all developing countries

SECTOR	EQUATION II			
	$\beta_{0j} / (\text{s.e.})$	$\beta_{1j} / (\text{s.e.})$	$H_0: \beta_{1j} = 1 /$ p-value	$H_0: \beta_{1j} < 1 /$ p-value
j=manufacturing	-.0096	.5819***	Reject H_0 (0.0000)	Retain H_0 (1.0000)
	.0115	.0566		
	R2	0.620		
j=agriculture	-.0120	.1278		
	.0066	.0748		
	R2	0.566		
j=services	.0209***	.2118***	Reject H_0 (0.0000)	Retain H_0 (1.0000)
	.0054	.0545		
	R2	0.342		
j=commerce	.0224***	.0028		
	.0046	.0564		
	R2	0.400		
j=transport and communications	.0098	.3803***	Reject H_0 (0.0000)	Retain H_0 (1.0000)
	.0124	.0728		
	R2	0.4072		
j=business services	.0231	.3107***	Reject H_0 (0.0000)	Retain H_0 (1.0000)
	.0141	.0463		
	R2	0.541		
j=public services	.0195***	.3470***	Reject H_0 (0.0000)	Retain H_0 (1.0000)
	.0054	.0858		
	R2	0.385		
N	174			

Note. OLS estimations with fixed effects and Panel Corrected Standard Errors accounting for group-wise heteroskedasticity, cross sectional dependence and serial correlation. Dummy coefficients estimates are available on request. Legend: s.e. for standar deviation; * p<0.05; ** p<0.01; *** p<0.001

Table 6. Panel data estimation of Kaldor's Second Law
(i) Asia

SECTOR	EQUATION II			
	$\beta_{0j} / (\text{s.e.})$	$\beta_{1j} / (\text{s.e.})$	$H_0: \beta_{1j} = 1 / \text{p-value}$	$H_0: \beta_{1j} < 1 / \text{p-value}$
j=manufacturing	-.060***	.695***	Reject H_0 (0.0000)	Retain H_0 (.99999159)
	.0082	.070		
	R2	0.766		
j=agriculture	-.0307***	.461***	Reject H_0 (0.0000)	Retain H_0 (.9999995)
	.0103	.1101		
	R2	0.587		
j=services	.0252***	.283***	Reject H_0 (0.0000)	Retain H_0 (1.0000)
	.0065	.0749		
	R2	0.333		
j=commerce	.03134***	.1033		
	.0083	.1013		
	R2	0.091		
j=transport and communications	.0231	.2626**	Reject H_0 (0.0000)	Retain H_0 (1.0000)
	.0124	.0984		

	R2	0.377		
j=business services	.0554***	.2414***	Reject H ₀ (0.0000)	Retain H ₀ (1.0000)
	.0108	.0491		
j=public services	R2	0.419		
	.0319*	.1968		
	.0107	.1168		
	R2	0.453		
N	54			

(ii) Latin America

SECTOR	EQUATION II			
	β_{0j} / (s.e.)	β_{1j} /(s.e.)	H ₀ : $\beta_{1j} = 1$ / p-value	H ₀ : $\beta_{1j} < 1$ / p-value
j=manufacturing	-.0082	.2992		
	.0093	.1964		
	R2	0.427		
j=agriculture	-.0073	-.1025		
	.0078	.2102		
	R2	0.118		
j=services	.0245***	.0033		
	.0043	.0930		
	R2	0.360		
j=commerce	.0223	.0185		
	.0049	.1037		
	R2	0.389		
j=transport and communications	.0161	.1964		
	.01348	.1467		
	R2	0.075		
j=business services	.0261	.1772*	Reject H ₀ (0.0000)	Retain H ₀ (1.0000)
	.0151	.0825		
	R2	0.580		
j=public services	.0207***	.2691		
	.0056	.1624		
	R2	0.315		
N	54			

(iii) Africa

SECTOR	EQUATION II			
	β_{0j} / (s.e.)	β_{1j} /(s.e.)	H ₀ : $\beta_{1j} = 1$ / p-value	H ₀ : $\beta_{1j} < 1$ / p-value
j=manufacturing	.0301	.718***	Reject H ₀ 0.0152	Retain H ₀ .99242332
	.0228	.1158		
	R2	0.613		
j=agriculture	.0116	-.110**		
	.0065	.0400		
	R2	0.559		
j=services	.0281**	.30794**	Reject H ₀ (0.0000)	Retain H ₀ (1.0000)
	.0105	.0949		
	R2	0.378		
j=commerce	.0805***	.1104		
	.0172	.109		
	R2	0.305		
j=transport and communications	-.0182	.666***	Reject H ₀ (0.0000)	Retain H ₀ .99988027
	.0211	.0907		
	R2	0.556		
j=business services	.0143	.8220***	Retain H ₀ (0.0779)	Retain H ₀ (.96105105)
	.0120	.1009		
	R2	0.623		
j=public services	.0031	.3958**	Reject H ₀ 0.0000	Retain H ₀ .99999984
	.0154	.1180		
	R2	0.438		
N	66			

Note. OLS estimations with fixed effects and Panel Corrected Standard Errors accounting for group-wise heteroskedasticity, cross sectional dependence and serial correlation. Dummy coefficients estimates are available on request. Legend: s.e. for standar deviation; * p<0.05; ** p<0.01; *** p<0.001

5. Final remarks

Kaldor's old ideas remain valid even now with respect to developing economies: manufacturing has been an engine of growth during the past three decades across Asian, Latin American and African countries. We also find empirical support in favour of some services sub-sector, particularly in Asia and Latin America. Business services seem to allow productivity growth by the same Kaldorian mechanisms that have traditionally made manufacturing the driver of growth. This fact is related with their important (forward and backward) inter-industry linkages and with their use of knowledge and technology. Therefore, this kind of services seems to complement rather than replace manufacturing as an engine of growth in developing countries. This may explain why business services (still) do not play a significant role in African economies with weaker manufacturing basis than many Asian or Latin American countries.

The heterogeneity of the service sectors needs to be taken into account in the debate of how the productive structure of developing countries affects growth. Although being preliminary, our results convey an important policy message: a core manufacturing sector is critical for growth. Yet, there is no need to fear "deindustrialisation" if capabilities are being promoted in some specific service sectors.

The Kaldorian framework relies on an unproblematic take on productivity measurement. Nevertheless, the accurate measurement of services productivity is still an unresolved issue. Moreover, at the time this framework was developed there was a clear-cut distinction between sectors in an economy. At present, the distinction between many service and manufacturing industries is debatable since their boundaries have changed during the course of time.

Some scholars argue that the consolidation and stability of democracies may be hampered by "premature deindustrialization" (Rodrik, 2015). In any case, the political consequences of the surge of services in developing areas are complex and deserve further scrutiny. Other issues still need to be addressed in the context of this investigation and offer a promising future research agenda. First, the estimation of Kaldor's Laws is an econometrical challenge. There is still room for further improvements as regards the use of instrumental variables estimations, non-linear estimations, etc. Moreover, an input-output analysis would allow a better understanding of the relative contribution of final and intermediate demand to changes in the sectoral structure of developing economies. Finally, it would be interesting to take into account the heterogeneity of the manufacturing sector itself as well of business services in order to have further insights of specific sectoral engines of growth in developing economies.

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XXV. International RESER Conference, 2015
INNOVACIÓN, SERVICIOS Y DESARROLLO LOCAL:
EL CASO DE LA ACUACULTURA EN MEXICO
Minerva Celaya,¹ Araceli Almaraz,² Alfredo Hualde³
El Colegio de la Frontera Norte

Abstract

Mexican experiences in fishing farm started early 20th Century, on the contrary, the aquaculture activities are significant in last decades. The main area focused on aquaculture activities is located in northwest Mexico. Our hypothesis is that local aquaculture systems linked to external commercial chains can respond more rapidly to global demand if they have capabilities and specialized services. If one location concentrates strategic services, followed by fishing farmers, entrepreneurs, researchers –biologists-, investors, and governmental offices, the system can be growth. To verify the hypothesis we have designed an inductive and comparative methodology. Our interest is focus on aspects controlled by local actors like entrepreneurs or R&D, and what is the government policy pathway. We identified paths of local innovation and key services to it (support biotechnological techniques, services to genetics improvement, nutritional issues and growth process, and biological inputs).

1. La acuacultura como parte de los sistemas productivos territoriales, alimentarios y de innovación.

La acuacultura integra un conjunto de actividades que van desde los servicios especializados para el empaque y la venta de especies marinas hasta las actividades y servicios relacionados con la biotecnología, especialmente con lo que se conoce como segunda generación de la industria de la biotecnología y que está relacionada con el uso de células o cultivo de tejidos para el desarrollo acuícola.⁴ El Instituto Politécnico Nacional (2010) de México ha identificado cinco tipos de empresas: i) empresas especializadas en innovación en biotecnología, lo que implica actividades relacionadas con el desarrollo y la transferencia de tecnología, así como la generación de conocimiento y desarrollo de patentes;⁵ ii) empresas de innovación en ingeniería, las cuales se caracterizan por sus capacidades para la adopción de tecnología o unidades de manufactura, escalar procesos, desarrollo de ingeniería de productos finales, ingeniería básica y de detalle e ingeniería de aplicaciones de procesos y de productos;⁶ c) empresas de manufactura de productos biotecnológicos, que dependen de la tecnificación de las unidades de producción;⁷ d) empresas de servicios técnicos y analíticos,

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⁴Véase Celaya, 2014.

⁵ Véase IPN, 2010.

⁶ Estas empresas no generan conocimiento nuevo, su particularidad radica en su capacidad para adaptar procesos a la realidad reflejados en una aplicación industrial y comercial (IPN, 2010).

⁷ Se incluyen en este grupo empresas de nivel básico, tales como plantas productoras de levaduras para la fermentación; empresas de nivel intermedio, como son las empresas productoras de antibióticos; y en un nivel desarrollado a las empresas de manufactura de vacunas (IPN, 2010).

que van desde mediciones físicas y de metrología, hasta mediciones de química fina,⁸ y e) empresas consumidoras de productos e ingredientes de origen biotecnológico, las cuales participan en la integración de grandes cadenas de valor y permiten que un proceso o producto alcance la mayor penetración en el mercado (IPN, 2010). Otros estudios clasifican recientemente a la biotecnología por sus aplicaciones, en donde el aprovechamiento de recursos marinos corresponde a la biotecnología azul incluyendo la acuicultura, la química y la farmacéutica (Cuadro 1).

Cuadro 1. Biotecnología y aplicaciones.

Convenciones 2003-2007.

Convención	Color	Referencia y aplicaciones
<i>Cordia-EuropeaBio Convention 2003</i>	Azul	Recursos marinos
	Verde	La función de Europa en África para la colaboración en I+D y desarrollo de empresas biotecnológicas
<i>Bioscience Technology Facility 2004</i>	Blanca	Industrial
	Verde	Alimentaria y agricultura
	Azul	Recursos marinos
<i>12th European Biotechnology Congress, 2005</i>	Blanca	Industrial
	Roja	Farmacéutica
	Verde	Alimentos y pasto
	Azul	Medio ambiente
<i>Comisión Europea, 2007</i>	Roja	Aplicaciones de la salud (genómica y la proteómica)
	Verde	Desarrollo de alimentos biotecnológicos Energía renovable a partir de los recursos agrícolas
	Blanca	Aplicaciones industriales mediante la biotransformación y bioproducción Elaboración de productos bioquímicos, biofarmacéuticos, alimentos e ingredientes.
	Azul	Se relaciona con aplicaciones marinas y acuáticas.

Fuente: DaSilva (2004).

Si consideramos que la acuicultura en su sentido más amplio refiere al manejo biotecnológico de especies marinas entonces estamos hablando de un binomio entre técnicas de manejo y cuidado de especies. En el estudio realizado por Celaya (2015), se señala que los biólogos Aguilera, Noriega y Guzmán (1986), aluden a la acuicultura como aquella práctica que se ha ido tecnificado en sus métodos y técnicas para el manejo y control de los organismos cuyo hábitat es el agua, considerando desde su cosecha hasta su consumo, pasando por el procesamiento y la comercialización. Esta apreciación es consistente con la de las Naciones Unidas a través del organismo para Alimentación y Agricultura (FAO por sus siglas en inglés) quien también considera que la acuicultura representa una alternativa para ampliar la oferta y seguridad alimentaria, así como los encadenamientos productivos para el desarrollo regional (FAO, 2006). Esta perspectiva está relacionada con la identificación de tres tipos de orientación: a) acuicultura para la

⁸ Son empresas que fortalecen las unidades de control analítico dentro de las empresas, certifican laboratorios y procedimientos, y orientan a las empresas para que desarrollen y adopten los protocolos más adecuados para calidad y control analíticos de procesos (IPN, 2010).

repoblación,⁹ b) acuicultura artesanal o rural,¹⁰ y c) acuicultura comercial o industrial, que pretende alcanzar un incremento en la utilidad a partir de la fertilización y alimentos balanceados, por lo que requiere de instalaciones específicas, uso de tecnologías adecuadas e inversiones estratégicas (FAO, 2006). De acuerdo con la clasificación para México de los sistemas acuícolas podemos destacar tres tipos: i) los extensivos, ii) los semi-intensivos, y iii) los intensivos (cuadro 2).

Cuadro 2. Sistemas de producción acuícola según SENASICA, México.

Características	Extensivo	Semi-intensivo	Intensivo
Cuerpo de agua	Grande	Embalses pequeños o micropresas y estanques	Tanques, jaulas flotantes, cajas y <i>raceways</i> (canales de corriente rápida)
Densidad de siembra	Baja	Moderada	Alta
Base alimentaria	Natural	Natural y artificial	Artificial
Clima	Variaciones	Variado y controlado	Controlado
Nivel tecnológico	Bajo	Medio	Alto

Fuente: Servicio Nacional de Sanidad, Inocuidad y Calidad Agroalimentaria para México – SENASICA- (2009).

Las actividades de innovación y desarrollo de tecnología derivadas de la acuicultura se localizan en las dos primeros eslabones de la cadena productiva de cualquier cultivo, que son: insumo biológico y producción. En cada una de éstas fases es necesario el desarrollo y mejora de técnicas biotecnológicas para la aceleración y optimización de los organismos marinos (cuadro 3).

Cuadro 3. El binomio biotecnología azul-acuicultura/a

Fase productiva	Actividades centrales	Técnicas biotecnológicas
1. Generación de Insumo biológico	Desarrollo larvario y Producción de semilla	-Maduración sexual -Manejo de gametos - Control de sexo - Nutrición
2. Producción y cosecha	Siembra, crianza y cosecha	- Nutrición - Sanidad

Fuente: Elaboración propia con base en Castelló (1993).

a/Incluye solo aquellos eslabones donde se utiliza biotecnología.

Algunos sistemas en México han empezado a desarrollar acciones para controlar todo el ciclo biotecnológico y por tanto podría empezar a hablarse de una acuicultura integral, con una orientación a la innovación y a los servicios especializados. Esta hipótesis se sustenta en

⁹ Implica la introducción y el control de organismos acuáticos en diversos cuerpos de agua ya existentes, tales como: lagunas, costeras, embalses y ríos.

¹⁰ Se caracteriza por ser de subsistencia, se realiza a pequeña escala en instalaciones que requieren escasa modificación del ambiente natural y bajo nivel de tecnología. Destaca la participación de grupos familiares o cooperativas que tienen su residencia en el medio rural.

los hallazgos de Celaya (2014) quien refiere el alto componente científico – técnico, que se observa en cada una de las etapas que integran los cultivos de vida de especies marinas y que hacen de la actividad acuícola una organización única y no estandarizada, donde la innovación es requerida para acompañar el control de especies. La trayectoria de las actividades acuícolas en los últimos años por los distintos países, ha implicado cambios en las jerarquías de la producción mundial y en los de exportación. A continuación presentamos algunos datos de la última década, que nos llevan a una reflexión sobre los retos de la acuicultura integral, la oferta de servicios especializados, las redes de conocimiento y las cadenas de valor.

1.1 La acuicultura en el mundo y en México

En el 2007, de acuerdo con la FAO (2010), el 28% de los bancos de pesca a nivel mundial estaban sobreexplotados o se encontraban en situaciones de agotamiento y de recuperación debido a la excesiva extracción de especies. El 52% de los bancos estaba plenamente explotado y únicamente un 20% moderadamente explotado y con posibilidad de producir más (FAO, 2010). La industria pesquera mundial, dentro de la cual aún se cuantifican las actividades de la acuicultura, generó en el 2000 un total de 131 millones de toneladas. De ellas, el 73% provino de la pesca y el 27% de la acuicultura. Para el 2010, la producción aumentó a 148 millones de las cuales el 60% correspondía a la pesca y el 40% a la acuicultura (FAO, 2012). En el periodo disminuye la contribución promedio en la extracción de peces, y es en el 13% en el que se incrementa el promedio de la contribución de la producción acuícola.¹¹ Castelló (1993), ha mencionado que acuicultura marina, a diferencia de la continental, presenta mayor dificultad en aspectos biológicos y técnicos para la producción en intensiva de especies. Al respecto se señalan cuestiones ecológicas, pero incluso también de normatividad, relacionadas con áreas protegidas. Ambos aspectos restringen los cultivos en zonas costeras y aguas marinas, limitando con ello un acelerando proceso en las actividades de innovación, como ya se ha visto.

La producción acuícola en el continente americano durante la última década ha sido encabezada por Chile, que en el 2010 alcanzó una producción de 701, 062 toneladas ubicándose en el primer lugar, seguido de Estados Unidos y Brasil. El caso de México resalta porque bajó del cuarto lugar en el 2001 con 197 millones de toneladas, al sexto, siendo superado por Ecuador. En el quinto lugar permanece Canadá (CONAPESCA, 2012 y FAO, 2012). Actualmente otros países han incursionado en la acuicultura y se ubican ya como los principales competidores de México. Entre ellos se encuentra Perú, con una producción acuícola de 89 millones de toneladas en el 2011 seguido de Colombia, Cuba y Honduras con 80, 31 millones y 27 millones de toneladas, respectivamente (FAO, 2012).

Aunque el cultivo de peces en México comenzó a principios del siglo XX, la acuicultura de moluscos bivalvos y crustáceos es una actividad de reciente desarrollo concentrada fundamentalmente en tres estados del Noroeste: Sonora, Sinaloa y Baja California. Actualmente, la relevancia de la acuicultura radica tanto en su crecimiento como en los encadenamientos productivos y el desarrollo regional. En el 2000 la producción **pesquera nacional** fue de 1.4 millones de toneladas de las cuales el 88.5% provino de la pesca y apenas el 11.5 % de la acuicultura. Para el 2010, la tasa anual de crecimiento fue de 1.4%,

¹¹ De los 35.5 millones de toneladas de productos acuícolas en el 2000, el 60% provino de aguas continentales, mientras que el 40 % de aguas marinas; (FAO, 2005). Para el 2010 el incremento llegó a las 59.9 millones de toneladas, de las cuales el 70% provino de aguas continentales y solo el 30% de aguas marinas.

alcanzando apenas 1.6 millones de toneladas, de las cuales el 83% correspondió a la pesca y el 17% de la acuicultura (CONAPESCA, 2012), mostrando la actividad acuícola una tasa de crecimiento anual del 4.39%. En cuanto a las especies, las 5 principales son el camarón (que en el 2011 concentró el 41.7% de la producción acuícola nacional), la mojarra (27.06%) y el ostión (16.64%). En México la producción acuícola se concentra en tres zonas: a) Océano Pacífico que actualmente representa el 57% de la producción, la zona del Golfo y el Caribe, con cerca del 28% y la zona compuesta por entidades sin litoral con el 14%. En el 2010 la zona del Golfo y el Caribe tuvo una tasa negativa (-0.34%), mientras que las entidades sin litoral lograron un crecimiento del 11.8% (CONAPESCA, 2012).

2. El territorio, las cadenas de valor y las redes de conocimiento

Dos rasgos importantes se destacan recurrentemente en los estudios sobre el desarrollo económico especialmente a partir de la segunda mitad del siglo XX: por un lado, la concentración de espacios competitivos en territorios específicos; por otro, la importancia de formas organizativas como las redes que son complementarias de otras formas tradicionales como las empresas o las instituciones públicas. Sin duda, las empresas siguen siendo la organización central del desarrollo económico, pero actúan cooperando y compitiendo entre sí y con diversos actores de su entorno (Fagerberg, 2005: 12).

Así pues las formulaciones recientes que se apartan de la ortodoxia económica y adoptan una perspectiva territorial destacan la importancia de formas organizativas que interrelacionan las unidades económicas y los actores sociales, en el sentido de las «constelaciones de empresas» de las que habló Becattini (1988) en su descripción del distrito industrial. En la misma sintonía analítica se puede ubicar a Storper (1997), cuando se refiere a las «interdependencias no comerciales», como una forma de entender las relaciones no económicas que sin embargo posibilitan las transacciones económicas en su conceptualización de los *mundos de producción*. Los teóricos de los *clusters* destacan también que la acción conjunta de las empresas y de otras instituciones como centros tecnológicos y universidades, empresas de servicios como los abogados e instituciones financieras, entre otras, contribuyen de manera decisiva al éxito de la actividad económica (Saxenian, 2000; Humphrey y Schmitz, 1995; Pietrobelli y Rabellotti, 2004). Esta característica designada como «acción colectiva» se ha encontrado en los territorios innovadores de ámbito nacional (Lundvall, 2003) y en aquellos que toman a la región como ámbito de desarrollo de los procesos innovadores constituyéndose en Sistemas Regionales de Innovación (Cooke *et al.*, 2003; Fagerberg *et al.*, 2005).

Aunque las teorizaciones mencionadas comparten ciertos rasgos difieren en otros. En los distritos industriales se subraya una organización casi comunitaria en el ámbito local. En contraste las teorías de las cadenas globales de producción se centran en caracterizar y analizar la dinámica y coordinación entre empresas en espacios supranacionales. Autores como Cooke (2004, 2006) introducen matices importantes en la organización espacial de la producción. Desde el punto de vista de la gobernanza se distinguen los territorios que se denominan *grassroots*, de los territorios en red y de los *dirigistas*. En los primeros, el sistema productivo surge desde la sociedad, en los *dirigistas* son las instituciones públicas las que llevan la iniciativa y orientan las políticas regionales (regiones francesas, Eslovenia); finalmente los sistemas en red se constituyen como un tipo intermedio entre los dos anteriores. En lo que se refiere a los sistemas de negocios, se proponen también tres tipos: el sistema localista donde predominan las pequeñas empresas, el sistema interactivo donde existe un núcleo de empresas locales, pero también es importante la presencia de inversionistas medianos y grandes nacionales o extranjeros. Finalmente, el modelo

globalizado es el que surge inserto en redes globales y su dinámica responde a este tipo de lógica. El cruce del sistema de governance y el modelo de negocio dan lugar a distintas combinaciones que Cooke y sus colaboradores identifican para regiones específicas en distintos países y continentes. Sin embargo lo interesante además del predominio de distintos actores y dinámicas en cada tipo propuesto es la evolución que se detectó en un periodo de diez años.¹²

Estas son algunas de las teorías recientes que subrayan la importancia de las redes para el desarrollo, a nivel macro, meso y micro, donde interactúan individuos y organizaciones. Las interpretaciones acerca de algunos aspectos como la importancia de los actores o las secuencias de acciones virtuosas varían; también es cierto que regiones altamente exportadoras como Bangalore en India se apartan de un modelo de redes productivas densas en el territorio; las existentes son sobre de tipo global por las relaciones que los ingenieros de la India mantienen en Estados Unidos (Arora, 2003; Bresnahan y Gambardella, 2004). Sin embargo, ello no resta importancia al enfoque de redes en el desarrollo de software en India pues, como es sabido, muchos de los mercados a los que accedieron las empresas de este país y una parte importante de estas surgieron a raíz de las redes personales y colectivas construidas por los ingenieros hindúes tras su estancia como estudiantes en Estados Unidos.

La constatación de la importancia de las redes en el desarrollo económico no significa que los enfoques acerca de *redes* sean idénticos; por el contrario, entre los estudiosos encontramos distintas perspectivas con énfasis y objetivos diferentes. Ello tiene que ver, en parte, con el hecho de que el tema de las redes se ha abordado desde varias disciplinas como la economía, la antropología, sociología, la ciencia política o la teoría de sistemas. Luna (2003) distingue tres enfoques principales: el análisis de redes, las redes de acción política y las redes como mecanismo de coordinación. Desde una perspectiva económica, las redes han sido caracterizadas como un arreglo organizativo intermedio entre el mercado y las jerarquías. Se trata de estructuras flexibles, de tipo voluntario, en los cuales sus participantes buscan intercambios mutuamente beneficiosos. Se concibe que las redes suelen tener un carácter descentralizado y, para hacerlas eficientes, es necesario llevar a cabo un trabajo importante de coordinación que permita una comunicación fluida entre sus integrantes.

A pesar del carácter descentralizado de las redes y las relaciones relativamente igualitarias que en principio se les suponen, los integrantes de la red no mantienen forzosamente, ni todos tienen el mismo grado de influencia y de poder en la toma de decisiones. En los sistemas de redes, un aspecto fundamental son los nodos que señalan la ubicación de actores u organizaciones importantes dentro de la red. Estos sirven para explicar una parte importante de las dinámicas de las redes, aunque por supuesto no son los únicos actores

¹² La importancia del entorno cobra características particulares cuando el tejido productivo está conformado por pequeñas y medianas empresas. Las pymes suelen tener dificultades para acceder a información necesaria para sobrevivir y para desarrollar innovaciones debido a problemas de costos, escasez de personal calificado, deficiencias organizativas y limitaciones derivadas de su tamaño. Algunas no se plantean innovar sino únicamente sobrevivir, consolidarse como organizaciones, ser rentables y crecer en el mediano o largo plazo. Se consideran agentes débiles por la escasez de recursos humanos y financieros, las ineficiencias asociadas a la escala reducida y el bajo poder de mercado. «Sin embargo, la experiencia demuestra que las pymes que se agrupan en *clusters* pueden tener éxito y competir con las grandes empresas» (Bertini, 2000: 107).

que influyen en ellas. Entre los actores que integran una red, un papel importante lo ocupan los líderes. En la medida en que las redes tienen un carácter voluntario, el líder o los líderes tienen un cierto reconocimiento por parte de los miembros de la red. El reconocimiento surge de determinadas cualidades o atributos: conocimiento acerca del campo de especialización de la red, capacidad de crear consenso o de convencer a los miembros de la red, o bien cualidades de tipo moral, como la honestidad. De lo expuesto hasta ahora se deduce que, en el ámbito productivo y desde la óptica de redes, son importantes tanto los individuos como las organizaciones. La forma de organización de las redes y su inserción territorial son elementos explicativos importantes en el surgimiento de actividades económicas como la acuicultura. Desde esta perspectiva es factible modificar la idea de la frontera norte de México como último territorio parecido a los modelos de enclave y recuperar con ello el papel de los agentes y sus organizaciones.

3. Trayectoria de cultivos acuícolas y servicios en el noroeste de México. El caso de Ensenada, Baja California

Con base en la metodología de análisis propuesta para el estudio productivo-territorial que nos hemos propuesto, son determinantes las redes de conocimiento y las cadenas de valor de la red acuícola para el consumo humano. Nos propusimos identificar aquellos actores y mecanismos que han participado en la generación de proveeduría especializada e innovación para incrementar el valor agregado a los cultivos de ostión japonés y abulón rojo en la región de Ensenada. Los resultados de este trabajo se centran en el papel de los centros de I+D en el marco del extensionismo acuícola en México, el papel que ha tenido el Gobierno Federal desde organismos especializados en la promoción de la acuicultura vía el esquema de extensionismo acuícola ¹³; ii) la red de servicios y trayectorias de cultivos de exportación, en donde ciertos actores institucionales y productivos operan mecanismos de interacción y escalamiento de tecnológico; y iii) la recomposición de las cadenas de valor de dos especies marinas de consumo humano que se integran territorialmente en el territorio de Ensenada y se enlazan a mercados internacionales de Asia y Europa.

3.1 El papel de los Centros de I+D y el extensionismo acuícola en México: Trayectorias y red de servicios

El México el origen y la consolidación de los centros acuícolas impulsado por el Estado mexicano ha tenido un comportamiento errático. Con la finalidad de tener una visión general sobre el desenvolvimiento de la actividad acuícola en el país, se identificaron tres periodos sobre el surgimiento y desarrollo de los Centros Acuícolas Federales,¹⁴ que en su momento han representando el extensionismo acuícola en México (Cuadro 4). Las preguntas que tratamos de responder son: ¿Cuál es la red de servicios que ha venido acompañando el desarrollo de las actividades acuícolas en México? ¿Qué aspectos de la organización territorial están enfocados al desarrollo de servicios especializados y de innovación?

¹³ El extensionismo, hace referencia a la propagación o difusión del conocimientos a partir de acciones vinculadas con la gestión y promoción de nuevas tecnológicas así como el desarrollo de servicios de extensión cuyos ejes son la asistencia técnica, la transferencia de tecnología y la capacitación a los productores (Muñoz y Santoyo, 2010), con la finalidad de incrementar la productividad.

¹⁴ Actualmente los centros son operados y administrados por la Secretaría de Agricultura, Ganadería, Pesca y Acuicultura (SAGARPA) (CONAPESCA, 2015).

Veremos cómo estas interrogantes adquieren respuestas diferenciadas en torno al manejo de las especies seleccionados en este trabajo: ostión japonés y abulón.

Cuadro 4. Los tres grandes períodos de los Centros Acuícolas Federales de México

Período	Particularidades	Resultados
Primer período hasta 1970	- Evolución de la piscicultura extensiva	- La creación de los primeros centros piscícolas federales para la reproducción de crías, así como el esparcimiento de éstas en cuerpos de agua tanto naturales como artificiales ¹⁵ .
Segundo período hasta 2005	- Impulso y desarrollo capacidades territoriales en torno a las actividades acuícolas	- Avances sustantivos en lo que respecta al cultivo de la tilapia y de la trucha arcoíris. ¹⁶ - Retroceso en el apoyo por parte de los Centros Acuícolas Federales para el desarrollo de moluscos bivalvos y crustáceos
Tercer período actualidad	Baja producción de insumos biológicos de los Centros Acuícolas Federales	- Reestructuración de los centros acuícolas para modernizar sus instalaciones y optimizar sus operaciones.

Fuente: elaboración propia con base en información de FAO (1984), Avilés – Quevedo y Vázquez-Hurtado (2006) CONAPESCA (2015).

El ostión japonés (*ostra*): una especie *introducida*. El ostión, es uno de los moluscos comerciales más importantes a nivel mundial, por su gran aceptación en el mercado de alimentos y su rápido crecimiento y adaptabilidad a distintas condiciones ecológicas.¹⁷ Después de analizar el proceso de crecimiento de diversas especies, se optó por impulsar la acuicultura de ostión japonés en Ensenada,¹⁸ ya que el tiempo promedio necesario para producir una pieza de ostión sería de un año.¹⁹

Con el apoyo del gobierno federal estos trabajos científicos y técnicos, orientados a demostrar el potencial acuícola rindió frutos, ya que de 1976 a 1977 se construyó el primer laboratorio de producción de larvas (Cáceres-Martínez y Vázquez–Yeomans, 2013) en San

¹⁵ Corresponde al desarrollo de la piscicultura y consecutivamente la acuicultura tuvieron su comienzo en las aguas dulces de México (Rojas-Carrillo y Fernández – Méndez, 2006).

¹⁶ Véase Avilés – Quevedo y Vázquez – Hurtado, 2006.

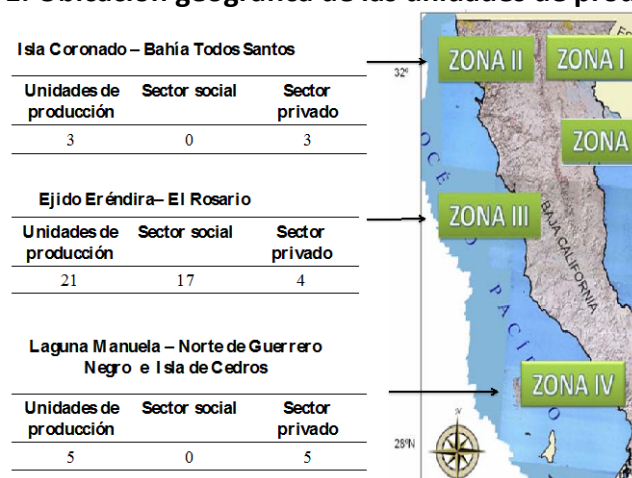
¹⁷ La introducción del ostión japonés, se dio a principios de los setenta como respuesta a las inquietudes de los gobiernos estatal y federal respecto al cumplimiento de los objetivos de investigación científica para los cuales se había creado la Escuela Superior de Ciencias Marinas (ESCM) de Ensenada. En relación con ello un grupo de oceanólogos graduados de la ESCM consideraron que la acuicultura sería una actividad que les permitiría desarrollar y aplicar sus capacidades científicas. Entrevista Dr. Saúl Álvarez Borrego.

¹⁸ La reserva indígena Lummi corresponde a nativos americanos del grupo *Coast Salish* que se localizan en occidente del estado de Washington en Estados Unidos (www.lummi-nsn.org). En el decenio 1970, la acuicultura emergió como una industria en la costa de Puget Sound, en dicho estado, como resultado del proyecto liderado por los indios para el desarrollo de un criadero y desove de ostras y producción de semilla. Lo cual, dio fin a la dependencia de insumo biológico proveniente de Japón (Clark y Finley, 1971).

¹⁹ Se contactó a la empresa Lummi Indian, que estaba adaptando las técnicas biotecnológicas del ostión del Atlántico al ostión japonés. Tres pasantes de oceanología de la ESCM hicieron una estancia en el verano de 1973, para aprender el desarrollo de biotécnicas, así como las técnicas para el cultivo de microalgas. Unos meses después de la estancia, mandaron la semilla de Seattle a San Diego, y posteriormente a Ensenada; allí se hicieron las sartas y balsas y se cultivaron con gran éxito. Así lo señaló en entrevista el Dr. Saúl Álvarez Borrego, Director de la Unidad de Ciencias Marinas a principios de la década de los setenta.

Quintín (Mapa 1). Sin embargo, debido a la serie de problemas que enfrentaba el sector social en términos de su organización productiva ejidal - pesquera²⁰, la academia vio frustrada su intención de impulsar la actividad acuícola en las comunidades ribereñas.²¹ Hacia finales de la década de los setenta, se impulsó en la Bahía de San Quintín, de manera independiente de la academia, el cultivo del ostión japonés en la Bahía Falsa, por iniciativa de algunos agricultores y pescadores de la región.²² Trece años después de haberse formado la cooperativa, concluyó la concesión del cultivo de ostión y los socios de la SCPP Bahía Falsa deciden constituirse en sociedades mercantiles, y para fines del 1994 y principios de 1995 se otorgaron las concesiones de esas nuevas empresas que fueron las primeras.²³ Hoy en día el ostión japonés, de acuerdo con el CONAPESCA (2008) es la principal especie de cultivo en China, Taiwán y Canadá, por su enorme importancia comercial.

Mapa 1. Ubicación geográfica de las unidades de producción



Fuente: elaboración propia con base en información del CESAIBC (2014).

En México, tanto en Baja California como Baja California sur se cultiva, para su exportación, el ostión japonés, tanto en áreas de cultivo como en plantas empacadoras certificadas por el Programa Mexicano de Moluscos Bivalvos. Asimismo, y es una de las especies que ya se

²⁰ Señala el Dr. Álvarez que hacia finales de los setenta, se fomento en algunos estados como Sinaloa el desarrollo de cooperativas ejidales–pesqueras con la finalidad de poner fin a la disputa entre agricultores y pescadores, como resultado de algunas fallas que se presentaron durante el reparto agrario en México. Y es que en el caso de ciudades costeras como San Quintín, algunos campesinos habrían recibido terrenos no aptos para la agricultura como dunas y lagunas costeras, lo que impulsó al agricultor a invadir las playas para recolectar moluscos y venderlos. Un problema fue que las playas estaban concesionadas a las cooperativas pesqueras.

²¹ Entrevista, Dr. Saúl Álvarez Borrego.

²² El proyecto nace en 1977 cuando el Departamento de Pesca promovió un programa social denominado PIDER, Programa Integral de Desarrollo Rural, para el beneficio de las comunidades ribereñas y el maricultivo del ostión japonés (CONAPESCA, 2008). Durante este período, se formó la Sociedad Cooperativa de Producción Pesquera “Chapalita” S.C.L., con la finalidad de acceder a los recursos que ofrecía el PIDER. Mientras conseguían el recurso, se visitaron diversos laboratorios en Estados Unidos y se optó por traer larvas y semillas ya fijadas en concha madre del laboratorio de los Indios Lummi. Sin embargo, era una cooperativa con tintes ejidales por lo que en 1981 se cambia a Sociedad Cooperativa de Producción Pesquera (SCPP) Bahía Falsa, que fue la pionera en el cultivo en la región (entrevista al Dr. Saúl Álvarez Borrego).

²³ A partir del testimonio del Ocean. Carlos Lozoyas.

integra en la Carta Nacional Acuícola 2012. Las fases de desarrollo por las que ha transitado de esta especie son: experimental, en desarrollo y consolidación del cultivo. Lo que es relevante mencionar es la consolidación del ostión japonés debido a la acumulación de conocimiento por parte de los productores en cuestiones relacionadas con las enfermedades y parásitos de los moluscos bivalvos y control sanitario a través de cursos teórico – prácticos con el sector académico.

El Abulón rojo: de la pesca al cultivo. En la región, la explotación comercial del abulón rojo a partir exclusivamente de la captura inició por la comunidad de chinos en Baja California (1850 hasta 1900) (Dávalos, 1990) y posteriormente, de 1900 a 1931, por los japoneses quienes controlaban todo el proceso, es decir la captura, comercialización e industrialización desde esta región. La pesca se realizaba de manera sistemática y continua, parando sólo cuando las condiciones climatológicas no lo permitían y con buzos sólo de nacionalidad japonesa.²⁴ Fue hasta 1937, cuando la explotación y por ende la acuicultura de especies valiosas como el abulón, se convertirían en derecho exclusivo de las cooperativas pesqueras²⁵.

El manejo experimental del abulón surge durante la década de 1979 con la construcción de un laboratorio ubicado en la ciudad de Ensenada para la producción de semilla de tipo experimental.²⁶ Para finales de esta década (1978), el Instituto Nacional de Pesca (INAPESCA) construyó el Centro Acuícola de Eréndira (al sur de la ciudad de Ensenada), con la finalidad de llevar a cabo investigación pesquera y acuícola en la región. Los primeros proyectos en la década de 1980 para la producción de semilla de abulón sucumbieron ante la crisis de 1982 en México. Las instalaciones quedaron casi abandonadas y sin fondos para seguir operando. No obstante, la construcción de este centro acuícola fue una experiencia que dio como resultado el surgimiento de una generación de oceanólogos que empezaron la experimentación de reproducción, producción de larva y producción de huevos de abulón. Estas tareas convergieron algunos experimentos para su siembra en California y en Japón.²⁷ El gobierno federal, promovió en 1984 un convenio entre la Secretaría de Pesca y la Federación Regional de Sociedades Cooperativas de la Industria Pesquera en Baja California tratando de disminuir las dificultades que presentaba el Centro Acuícola de Eréndira, (como las relacionadas con personal y apoyos económicos ágiles). El objetivo fue la operación conjunta del centro pero el esquema no funcionó en parte por la desorganización de los técnicos cooperativistas asignados al proyecto y dos años más tarde se canceló el convenio (Dávalos, 1990).

En 1984 también se inició un programa de investigación dentro del Instituto de Investigaciones Oceanológicas (IIO) que buscó complementar los esfuerzos en el manejo de

²⁴ Poco antes de la Segunda Guerra Mundial, se quemaron y abandonaron las instalaciones por parte de este equipo (Dávalos, 1990). De ahí que a los pescadores mexicanos les tomara algunos años aprender las técnicas de pesca y comprender la necesidad de organizarse para poder acceder a apoyos gubernamentales.

²⁵ Esto prevaleció hasta 1992, cuando cambió la normatividad sobre la actividad pesquera y acuícola en México.

²⁶ Según Dávalos (1990), la Dirección de Pesca, creó el laboratorio “El Sauzal”, donde se introdujeron de manera experimental semillas de varias especies de abulón. La falta de continuidad en este esfuerzo generó que el laboratorio cayera en desuso antes de 1975 y fuera posteriormente desmantelado. Hasta finales de la década de los setenta (1977), México había obtenido siempre el primer lugar a nivel mundial en producción del abulón por extracción. Sin embargo, a partir de esta fecha, menciona Dávalos (1990), las poblaciones naturales ya no soportaron el ritmo de la sobreexplotación, siendo esto el detonante para retomar los intentos de impulsar la acuicultura (manejo de especies) que se habían iniciado a principios de los setenta.

²⁷ Así lo indica en entrevista Benito Altamira.

la semilla de abulón a través del desarrollo de tecnología de siembra y engorda de la semilla. El primer obstáculo fue la escasez de semilla en los laboratorios nacionales debido a los bajos niveles de producción que prevalecían; así que se iniciaron estudios con semilla comprada o donada por laboratorios de Estados Unidos (Searcy *et al.* 1988). Al final de la década, los avances científicos en el cultivo de abulón generaron interés en algunos estudiantes de oceanografía de la ESCM quienes, al ver la viabilidad del cultivo, se aventuraron a formar sus propias cooperativas y se asociaron con la principal concesionaria dedicada a la cosecha de sargazo gigante (alga marina) en Baja California. Fue así como surgió a finales del año 1991 la primera sociedad anónima para el cultivo de abulón en el mar: Abulones Cultivados.²⁸

En 1992, la empresa firmó su primer convenio de 7 años y posteriormente otro de 15 años con el gobierno federal. El objetivo fue el desarrollo de tecnología para el cultivo del abulón rojo. Con la anuencia de los ejidatarios los oceanólogos tomaron posesión de las instalaciones existentes en el Centro Acuícola de Eréndira en el ejido Eréndira. Para mediados de la década, la empresa desarrolló la tecnología para producir propia semilla propia alcanzando el éxito en 1997. De manera paralela se logró el permiso para importar medio millón de semillas de California acondicionadas para cultivo de abulón, permitiendo que las pruebas en mar se dieron a una escala mayor.²⁹ Producto de la adaptación de la tecnología utilizada en el estado y con el apoyo de las Universidades en la región también se desarrolló tecnología propia para alimentar a las postlarvas. Debido a los efectos de fenómeno natural El Niño, en 1992, la empresa se concentró en la engorda terrestre con un sistema de bombeo de 24 horas, lo cual si bien significó un incremento en los costos de operación de la empresa, mejoró el control y el monitoreo de las condiciones de la engorda. Para principios del siglo XXI, se retomó la colaboración con los investigadores de la región la cual continúa de manera sostenida y contribuyendo al desarrollo de la tecnología del cultivo en las áreas de asentamiento larval y cultivo de postlarvas y juveniles. Fue así como durante la década de 1990 se formalizó la integración de un equipo multidisciplinario con investigadores regionales y la primera sociedad anónima para llevar a cabo actividades científicas relacionadas con genética, nutrición y patología, relacionadas con el abulón.

En conclusión, se puede observar que la trayectoria por la cual transitan las especies para lograr su consolidación varía, en parte por: i) la existencia de estudios sobre las condiciones biológicas y tecnológicas de la especie; y ii) su relevancia económica, ésta en términos de su utilización para el consumo humano o industrial. En ambos casos, se advierte que el gobierno federal juega un rol esencial ya que es a partir de su aprobación, con políticas y programas, que la evolución de una especie para su cultivo puede avanzar de manera articulada y rápida con su entorno.

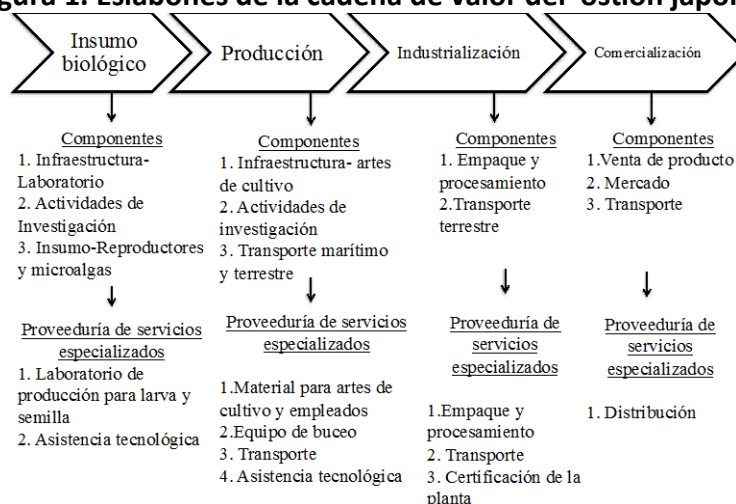
3.2 Recomposición de las cadenas de valor: la importancia de la integración territorial en acuicultura

²⁸ Tal es el caso de tres jóvenes oceanólogos, cuyo proyecto tenía contemplado la siembra de semilla de abulón, que proporcionarían un investigador de la Universidad Autónoma de Baja California en coordinación con un productor de semilla en California.

²⁹ El Centro Acuícola se convirtió en un aula improvisada del sector privado, por la cual pasaron, cerca de 10 generaciones de entre 6 a 12 técnicos de todas las cooperativas pesqueras de abulón donde se les daban los cursos para generar el desove, entre otros aspectos (entrevista Benito Altamira, 2014).

El análisis de las cadenas de valor del ostión japonés y del abulón rojo, tiene como propósito identificar a los actores que participan como proveedores en cada uno de los eslabones (insumo biológico, producción, industrialización y comercialización) que integran la cadena, con la finalidad de puntualizar cómo los actores locales agregan valor al proceso productivo incrementando así la relevancia de las competencias territoriales para el desarrollo de la actividad acuícola : Cadena de valor del ostión japonés cultivado en Baja California. (Figura 1).

Figura 1. Eslabones de la cadena de valor del ostión japonés



Fuente : Celaya (2014).

Primer eslabón: Insumo biológico. Se hace referencia a la proveeduría y/o producción de larvas y semillas. En cuestiones de proveeduría de larvas y semillas, se identificaron distribuidores en el extranjero específicamente en la costa oeste de Estados Unidos y en Santiago de Chile (Cuadro 5).

Los proveedores a nivel regional y local se caracterizan por ser laboratorios de producción de larva y semilla, o bien, ostricultores que cuentan con el ciclo completo de cultivo, que sí bien, producen su propia semilla también la comercializan. Es necesario precisar que en el caso del insumo de larva fijadora de ostión, los proveedores principales se ubican en Estados Unidos ya que cuentan con certificados sanitarios por parte de los laboratorios y garantizan que las larvas no presenten ningún agente patógeno certificable (CONAPESCA, 2008).

Cuadro 5. Proveedores de larvas y semillas de ostión japonés

Escala	Total de proveedores	País	Estado	Sector privado	Sector público
Extranjero	3	USA	Washington	2	
		Chile	Santiago	1	
Regional	3	México	Baja California Sur	2	
		México	Sonora		1
Local	2	México	Baja California	2	

Fuente: elaboración propia con base en Guevara *et al.* (2010) y Tapia *et al.* (2013)

Con relación a la participación en el mercado estatal de proveedores, en 2008 predominaron los laboratorios estadounidenses con el 90%. Esto señala la alta dependencia que tienen los productores en Ensenada en la proveeduría de larvas y semillas. Los proveedores locales o

regionales no cuentan con la suficiente infraestructura para abastecer a la región CONAPESCA (2008). En la proveeduría de servicios tecnológicos, ésta puede estar orientada hacia el desarrollo y/o a mejoras en técnicas biotecnológicas como lo son: i) la reproducción de microalgas, ii) la maduración de reproductores, iii) el desove de reproductores, y iv) el período larvario. Los servicios son ofertados por las Instituciones de Educación Superior (IES), los centros de investigación e instituciones de carácter privado, todos ellos de carácter local y/o regional.

Segundo eslabón: Producción. Con base en información del CESAIBC (2014) se detectaron un total de 29 unidades de producción. Como se observa en el mapa 1, este molusco se cultiva a lo largo del Pacífico en la zona III (específicamente en la Bahía de San Quintín). Los cuerpos de agua donde se ubican las granjas acuícolas están certificados por la Comisión Federal para la Protección contra Riesgos Sanitarios (COFEPRIS) para su exportación a Estados Unidos. Es un cultivo semi-intensivo, lo que significa que se controla la subsistencia de los equilibrios biológicos a procedimientos artificiales, como lo es la regulación de temperatura, la salinidad, el bombeo, la filtración y niveles de oxígeno, para la fijación de la larva. Las técnicas de cultivo³⁰ varía y éstas pueden ser: i) en sarta, ii) *FLUPSY*, o sistema flotante de flujo ascendente (siglas en inglés), iii) *long-line* y iv) francés (Tapia *et al.* 2013).

En el eslabón de producción (Figura 1), la proveeduría gira en torno al esquema de cultivo, el equipo de trabajo de los empleados utilizados para la siembra y la cosecha, el transporte y los servicios tecnológicos. Con base en una desagregación básica de los materiales y equipo, se identificó el material que utilizan los productores para la construcción de sus artes de cultivo, ya sea para la fijación de la larva o bien para la pre-engorda y la engorda de la semilla (Cuadro 6). Como se advierte, los proveedores son locales a excepción del proveedor de estacones (vara tomatera) que se ubica en el estado de Sinaloa, al sur de Baja California. El equipo de trabajo refiere al equipo de buceo para el movimiento del producto en el mar; la botas, los delantales y los guantes, accesorios necesarios para los trabajadores y los distintos empaques que se utilizan una vez que el ostión es cosechado, son de proveeduría local. En tercer lugar, se identificó la proveeduría de transporte marítimo para llevar el producto a tierra. La proveeduría de transporte terrestre es utilizada para llevar el ostión a la planta empacadora o bien a intermediarios, distribuidores, comercializadores, restaurantes de la región o carretas. La proveeduría de transporte en ambos casos se da a nivel local.

Cuadro 6. Proveeduría de material, equipo y servicios especializados para el cultivo de ostión

Concepto	Fase	Características	Proveedor
	Siembra: Fijación de larva	-Concha madre: <ul style="list-style-type: none"> ○ Concha de ostión ○ Concha de almeja voladora y ○ Concha de almeja catarina - Cabo de polipropileno (3mm)	Local

³⁰ Las técnicas de cultivo pueden ser: i) en sarta, este sistema se utiliza en los canales y zonas de entre mares en donde se instalan las artes de cultivo para su pre-engorda y engorda; ii) *FLUPSY*, o sistema flotante de flujo ascendente (siglas en inglés), requiere un flujo mareal por lo menos 50 o 100cm por segundo para que funcione con eficiencia; iii) *long-line*, este método se utiliza en zonas profundas principalmente y canales en donde se forman corrientes, incluso mar abierto; y iv) francés, este sistema consta de camas.

I. Material – Artes de Cultivo	Siembra: Pre-engorda	Estructuras flotantes de: <ul style="list-style-type: none"> ○ Poliestireno o foam ○ Fibra de vidrio ○ Plástico de 200 lt con emparrillado de madera o estacones - Bomba sumergible de tipo axial de 3/4 Hp - Canal de distribución de fibra de vidrio - Tinas construidas con fibra de vidrio - Tubo de PVC - Malla de 1 a 2 mm	Local
	Siembra: Engorda	-Estacones (vara tomatera)	- Sinaloa
	Racks (estantes) o Camas	-Tuberías de ABS -Varilla corrugada - Tambos, canastas nestier, canastillas metálicas plastificadas, o bastidores de madera rectangulares - bolsas mosquiteras	-Local
II. Equipo de trabajo	Siembra y cosecha	-Equipo de buceo -Botas -Delantales -Guantes	Local
	Cosecha	-Empaque para el ostión: <ul style="list-style-type: none"> ○ Costal cebollero ○ Caja de madera ○ Caja de cartón encerado ○ Hielera de poliestireno 	Local
III. Equipo de transporte	Siembra : Marítimo	-Embarcaciones grandes -Embarcaciones menores Pangas de madera (remo o motor fuera de borda) Pangas de fibra de vidrio (remo o motor fuera de borda)	Local
	Cosechado: Terrestre	- Pick up - Van caja seca - Van caja refrigerada - Camión caja seca - Camión caja refrigerada	Local
IV. Servicios tecnológicos	Siembra y cosecha	- Cursos de Buenas Prácticas de manejo de Moluscos Bivalvos - Análisis para la sanidad, inocuidad y certificaciones	Local

Fuente: elaboración propia con base en información de CONAPESCA (2008) y Guevara *et al.* (2010) y Tapia, *et al.* (2013).

Los servicios tecnológicos giran en torno al desarrollo o perfeccionamiento en las técnicas de cultivo existentes, estudios y análisis para la certificación de las aguas y del producto, pues la mayor parte del cultivo del ostión japonés se produce en el mar, lo que implica filtración,

ingestión, absorción y asimilación de nutrientes. Por tanto, es indispensable asegurar que el producto esté libre de patógenos para el consumo humano. De ahí que sea central la capacitación a los productores y técnicos en el manejo de buenas prácticas.

Tercer eslabón: la industrialización. Las transformaciones aplicables al ostión giran en torno a su presentación: desconchado, en media concha, ahumado o bien empacado al vacío. En Ensenada, México, la única presentación que se coloca en el mercado es en concha fresco-vivo. Por lo tanto, en este eslabón participan solo empresas que cuentan con una planta procesadora o de empaque y donde el mayor grado de industrialización que se le da en valor agregado al producto es la presentación en cajas de *foam* con hielo en gel para mantenerlo fresco y el empaque en cajas de cartón encerado para su venta en México y en mercados de exportación (CONAPESCA, 2008). Al momento de hacer esta investigación se identificaron 6 empresas empacadoras para exportación en México, de las cuales 5 están en Ensenada (Cuadro 7). Las plantas de empaque cuentan con dos líneas de producción: ostión fresco vivo en su concha y ostión vivo en su concha a partir de los estándares de calidad de exportación. En envíos aéreos el ostión se empaqueta en bolsa y se coloca en una hielera de poliestireno con hielo en gel, para mantener el producto frío y que garantice mayor vida anaquel. Es importante señalar que las plantas deben de estar certificadas y autorizadas por el Programa Mexicano de Moluscos Bivalvos al igual que los cuerpos de agua, (PMSMB) y ceñirse a los lineamientos del *National Shellfish Sanitation Program* del *Food Drug Administration* para la exportación.

Cuarto eslabón: la comercialización. La mayoría de los productores de ostión venden en los mercados locales, regionales y nacionales a grandes intermediarios y/o centros de acopio. Los propios productores son los encargados de mover su producto. Se identificaron 29 unidades de producción. El 48% de los empresarios atiende la demanda nacional (entidades fuera de Baja California). El 24% atiende al mercado regional (municipios de Baja California). Y el 24% restante a una combinación de mercados nacionales e internacionales vía Estados Unidos: mercados de Los Ángeles y Boston.³¹ Un aspecto importante entre los ostricultores es que su proximidad geográfica ha generado un asociacionismo, sin importar si son micro, pequeñas o medianas empresas. La red de productores hace frente a las dificultades en cada uno de los eslabones de la cadena productiva. Las dos empresas integradoras que existen actualmente ofrecen a los productores acuícolas diversos servicios que varían desde el abasto de las artes de cultivo, compras e importación de insumos biológicos utilizados para desarrollar su actividad hasta aspectos administrativos, como contables, servicios de acopio, procesamiento, comercialización, asistencia técnica y adopción de nuevas tecnologías.³²

Cuadro 7. Plantas de proceso y empaque de ostión en Ensenada, México.

Empresa	Actividades	Ubicación
Acuicultura Integral S.A de C.V	Cultivo, empaque y comercialización	Ensenada
Pesquera Cortez	Cultivo, empaque y comercialización	Ensenada
Sol Azul S.A de C.V	Cultivo, empaque y comercialización	BCS

³¹ Con base en datos del CONAPESCA 2008 y de la entrevista a Héctor González.

³² Entrevista, a Juan Carlos Lapuente.

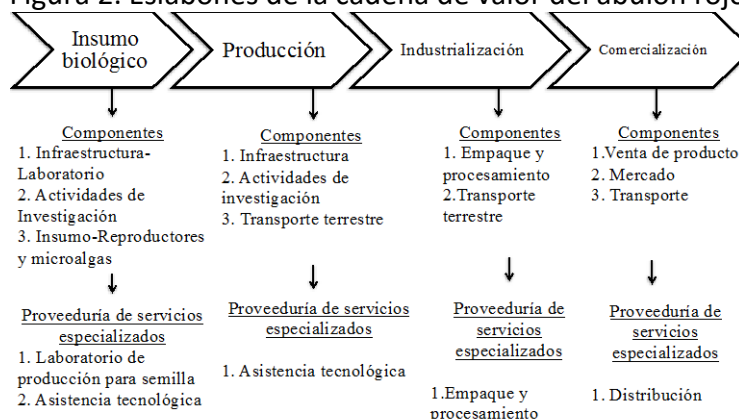
Agromarinos S. A de C.V	Cultivo, empaque y comercialización	Ensenada
Maxmar S.A de C.V	Cultivo, empaque y comercialización	Ensenada
Acuícola San Quintín S.A de C.V	Cultivo, empaque y comercialización	Ensenada

Fuente: elaboración propia con base en información de CONAPESCA (2008)

Cadena de valor del abulón rojo cultivado en tierra en Baja California

El abulón rojo, se cultiva en tierra lo cual implica un mayor control de los productores en cada uno de los eslabones que integran la cadena. Si bien, los componentes en cada uno de los eslabones no varía mucho en comparación con el cultivo de ostión japonés, si se observa una disminución en los servicios especializados en parte por sus cultivos están en tierra y no en mar (Figura 2).

Figura 2. Eslabones de la cadena de valor del abulón rojo



Fuente: elaboración propia

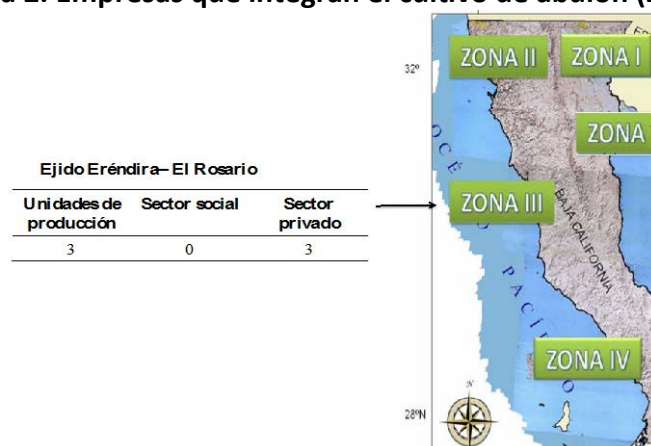
Primer eslabón: Insumo biológico. Los proveedores de semilla de abulón cultivada se dividen en dos grupos: a) dedicados a la producción y venta de abulón cultivado en cualquiera de sus etapas de desarrollos y b) dedicados a la producción de abulón para repoblamiento. La proveeduría de semilla es desarrollada por tres laboratorios ubicados en el estado de Baja California. Dichos recintos forman parte de la infraestructura de las tres empresas que llevan a cabo cultivo de abulón para comercialización o repoblamiento. En los laboratorios también se cultiva el alimento de las postlarvas, juveniles y los reproductores (microalgas) en sustratos artificiales tales como bales de plástico, estanques circulares de fibra de vidrio, láminas onduladas o planas de cloruro de vinilo, policarbonato y fibra de vidrio. En la proveeduría de servicios tecnológicos, se identificaron gira en torno a la mejora de semilla a partir del desarrollo de técnicas biotecnológicas para cuestiones de genética, nutrición y patología. Estas actividades se fortalecen y complementan con el desarrollo de proyectos a partir de contratos con las IES, centros de investigación e institutos privados a nivel local con CICESE y IIO y a nivel regional, con el CIBNOR.

Segundo eslabón: Producción. Las granjas de abulón rojo se ubican en un predio privado, el cual se encuentra dentro de la zona III de cultivo (Mapa 2). En el Ejido Eréndira se ubican las dos empresas que comercializan el abulón. Las empresas que comercializan el abulón, se caracterizan por tener un sistema de producción intensivo; el cultivo se hace en estanques

de cemento con densidades de producto muy altas, intercambio de agua cada 24 horas al igual que el monitoreo y con parámetros continuos. Los procesos que se siguen, al igual que los métodos de cultivo, los desarrolla el empresario acuícola. Ellos no compran la tecnología de engorda, pues tanto la biotecnología como el desarrollo de tecnologías se han desarrollado internamente con las modificaciones requeridas en determinados momentos. Al igual que en el sector ostrícola privado, las empresas son propiedad de Oceanólogos. Asimismo, los empresarios especializados de este sector llevan a cabo todas las fases del cultivo, lo que implica que ellos mismos desarrollan su propia semilla; en algunos casos incluso se han diversificado y producido semilla de ostión japonés. En este sentido, la proveeduría de servicios tecnológicos ha girado en torno a la mejora de tecnología para el asentamiento de larvas, cultivo y postlarvas, y mejora de líneas genéticas, en tecnología para alimentación, y en el control sanitario.

Tercer eslabón: La industrialización. La presentación tradicional del abulón es en fresco-vivo, enlatado en salmuera y congelado. En el caso de las dos empresas que comercializan el abulón en Ensenada, ninguna de ellas cuenta con planta procesadora, siendo la proveeduría del empaque local. Cuarto eslabón: La comercialización. Son los propios productores los que distribuyen su a partir de la demanda de abulón en vivo en Estados Unidos, y abulón procesado en China y Singapur.³³

Mapa 2. Empresas que integran el cultivo de abulón (2015)



Fuente: elaboración propia con base en información del CESAIBC (2014).

A partir del análisis de la cadena de valor del ostión japonés y abulón rojo cultivados en Baja California, vemos que sí bien la proveeduría de material para la construcción del sistema de cultivo es local, el desarrollo y mejoras de arte de cultivo es llevado a cabo por los empresarios acuícolas. Ello difiere de los servicios tecnológicos en los eslabones del insumo biológico y de producción, donde se requiere absolutamente la red de colaboración con las IES, las instituciones privadas y los centro de I+D para la obtención del organismo acuático, y generación de condiciones necesarias para su siembra, crianza y cosecha.

Servicios especializados e innovación territorial

La proximidad geográfica entre los productores acuícolas de Ensenada les ha permitido generar esquemas de organización a partir de empresas integradoras dedicadas a ofrecer servicios especializados de: i) el abastecimiento del insumo biológico de larva y semilla de

³³ Entrevista a Enrique Vázquez, 2013.

osti3n,³⁴ ii) el 3rea de producci3n, con lo que es el suministro de artes de cultivo, embarcaciones con equipo de buceo, as3 como equipo de transporte; iii) la industrializaci3n, donde se contemplan servicios de empaque en plantas certificadas; iv) servicios de comercializaci3n, aunado a la compra de osti3n. Aqu3 la red de intercambio de informaci3n opera de manera formal y son consideradas como modelos para el desarrollo biotecnol3gico que podr3an potenciar la actividad acu3cola en la regi3n.

Si bien las integradoras han absorbido algunos servicios especializados, los productores est3n conscientes de la necesidad de colaborar mayormente con las IES, instituciones privadas y centros de I+D para la mejora de sus l3neas gen3ticas y as3 disminuir perdidas por compras fuera de la regi3n. Tambi3n pueden ayudar a mejorar la dietas nutricionales de las especies. Los dos aspectos disminuir3an la mortalidad en las fases de pre-engorda y engorda y situaciones patol3gicas (Primer Foro de Acuacultura en Ensenada, 2013). Por lo tanto, la colaboraci3n de los a3os siguientes deber3 enfocarse a los servicios tecnol3gicos, al estudio sobre patog3nesis, al diagn3stico de enfermedades y al an3lisis de agua, as3 como cursos te3rico-pr3ctico sobre tem3ticas relacionadas con las enfermedades y control sanitario de moluscos bivalvos, y repoblamiento del abul3n. Actualmente los productores han accedido a los servicios de capacitaci3n pero la red con las instituciones de apoyo gubernamental opera de manera espor3dica.³⁵

En el mapa institucional de apoyo a la acuacultura en Ensenada es importante destacar el papel del Comit3 Estatal de Sanidad Acu3cola e Inocuidad de Baja California (CESAIBC) como intermediario y promotor de: a) cursos de capacitaci3n en materia de sanidad acu3cola, b) divulgaci3n de las acciones sanitarias, es decir como tratar y preservar en condiciones sanitarias 3ptimas a los organismos que cultiva; c) muestreos para la vigilancia epidemiol3gica, y d) promoci3n de eventos internacionales como el Simposium Internacional de Sanidad e Inocuidad Acu3cola, celebrado recientemente.

Conclusi3n

La acuacultura es una actividad de creciente importancia en M3xico. Sin embargo los retos son a3n may3sculos si se quiere acercar al peso que tienen otros pa3ses latinoamericanos en el contexto global de las exportaciones de productos acu3colas en el mundo. A pesar de ello hemos visto que la maduraci3n de redes de conocimiento y la configuraci3n de un sistema productivo regional como el acu3cola no corresponde a procesos que puedan implantarse con facilidad y donde la transferibilidad de tecnolog3as entre regiones no asegura el cambio o el dinamismo productivo. Queda claro, con la metodolog3a inductiva y comparada, que incluso a nivel de producto (especies marinas) en una misma regi3n suele haber diferencias importantes que requieren redes de conocimiento y colaboraci3n espec3ficas para el manejo de insumos biol3gicos, el impulso a las innovaciones, la transferencia de tecnolog3a, el cuidado de las semillas, los procesos de engorda y la comercializaci3n. La centralidad que tienen los servicios de biotecnolog3a en el desarrollo de la acuacultura es otro hallazgo importante. Debido a la gran variabilidad de los ambientes en los que se deben desarrollar los productos marinos para el consumo humano la acumulaci3n de conocimiento es vital, pero no como un aspecto de recuperaci3n constante, sino para el desarrollo de innovaciones tecnol3gicas. Los procesos de aprendizaje son procesos de aprovechamiento y destrucci3n

³⁴ En ambos casos deben de tener un certificado sanitario de calidad de origen.

³⁵ La capacitaci3n se ha enfocado en de fortalecer competencias a partir de cursos para validar nuevas t3cnicas de cultivo y el intercambio de experiencias sobre el uso de tecnolog3as, pr3cticas de manejo y medidas de control sanitario aplicadas para reducir la mortalidad.

de conocimiento. Las redes de los productores e investigadores, son vitales para la innovación como base del desarrollo biotecnológico y acuícola. El apoyo del gobierno federal y estatal, tampoco garantiza per se la consolidación de ambos cultivos. La capacidad de las instancias gubernamentales como de las universidades y los centros de I+D radica en avanzar conforme a las necesidades técnicas de los cultivos, que pueden variar incluso de ciclo en ciclo por las condiciones del ambiente. El mejoramiento de técnicas y servicios biotecnológicas para el desarrollo genético puede incrementar la calidad de las especies reproductores, pero ello no se puede anticipar con seguridad, o bien asegurar en el futuro cuando una técnica ha sido exitosa.

Los servicios especializados en Ensenada y su fuerte arraigo territorial son determinantes para avanzar en una mayor colaboración. No obstante, se ha identificado con la exploración de campo que la red no tiene esquemas constantes. El desarrollo de actividades de I+D dependerá de las problemáticas que enfrenta la actividad acuícola. El objetivo común es disminuir la dependencia del extranjero en los insumos biológicos, primer eslabón de ambas cadenas de valor y sector clave para desarrollar servicios de innovación biotecnológica.

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G2: KIBs and e-services

Chair: Leonel Corona-Treviño

THE TRADE SERVICE IN LATIN AMERICA (2002-2012)

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Abstract

The aim of this study is to analyze the flow of trade services from Latin American countries except Cuba, with emphasis on exports of services during the years of 2002-2012. To this end services are separated, according to Jimenez (2012) into three categories: contact services, shared services and services for skills development. As results: i) contacts services were more significant than shared services. ii) the trade balance of services in Latin America was deficient, only Panama, Costa Rica, Dominican Republic, Uruguay have a surplus balance in services every year; iii) although travel and transport (contact services) have the largest shares, the rates of growth of shared services indicate changes in the region. These changes may be related to the growth of manufacturing activities related to FDI and also with FDI inflows linked to offshoring of various services. Thus, the participation of Latin America in the value chain in services can be crucial for their development.

1 INTRODUCTION

According to the Brazilian Network for the Integration of Peoples (REBRIP, 2006) since the nineties, have been perceived three global trends in the service sector, although with different manifestations depending on the region.

First, the increasing share of services sector in the structure of employment and production in developed countries and some developing countries such as Latin American. In developed countries, the services sector has increased participation related to the demand, diversification of the pattern of consumption beyond the industrial and agricultural goods, but also a trend of increasing the supply of new services, which incorporate the technology, making it important to the performance of the industrial and agricultural sectors. In Latin America, this trend is associated with high levels of urbanization, the existence of a middle class with high purchasing power, and also a greater supply of workers.

Secondly, the services sector has increasingly responded by capital accumulation of the capitalist economy, favoring privatization, mainly of services. Privatization processes have allowed greater flexibility to economic groups offer services directly from their respective countries (via trade) or through foreign direct investment (FDI).

Thirdly the privatization process tends to lead to the formation of global oligopolies in the service sector. The greater presence of developed countries in trade in services is accompanied by a rise in FDI.

For Lopez (2009) the service sector has a growing share of global FDI flow because: i) delay of the service sector in the internationalization process; ii) increase in the share of gross domestic product (GDP) in most countries; iii) deregulation and privatization processes have extended access to foreign investors; and iv) the outsourcing process, which increased the demand of firms for services contracted out, since the development of telecommunications allows to search for new suppliers in other countries; v) technological changes that facilitate the development of offshoring.

The growth of international trade in services is explained with the development of global value chain (GVC) or the value chain. The CGV is split into large activities of companies, and the main activities are in the matrix, while routine activities, such as administrative management, human resources, accounting, among others, are held in subsidiaries located in third countries or outsourced to independent companies. So subsidiaries or subcontractors are introduced in the value chain as service providers (LOPEZ, NIEMBRO and RAMOS, 2011).

For the authors, the trade in services is an opportunity for developing countries to generate foreign exchange and jobs. They emphasize that Latin American countries have the possibility to enter and occupy a stable role within CGV in the segments of services. Latin Americans countries have advantages to compete in the services market, such as labor costs, skilled human resources, ICT infrastructure relatively developed, knowledge capacity in some sectors, similar time zone with the United States and cultural affinities.

Lopez, Niembro and Ramos (2011), claim that every year the flow of Latin American services trade increases. The larger trend is in the share of non-traditional services such as business services, IT and computing, communication services, financial services, insurance and engineering services and construction, which include greater intellectual content services, compared with traditional services, such as transportation and travel.

In 2012, among the non-traditional services, business services accounted for almost 32,100 million dollars in exports of services, accounting for about 64% of total exports to Latin America. The main exports classified in the category of business were: architecture and engineering (34%); other services (26%); and accounting services, administration and public relations (24%). These services account for 84% of exports of business services. The main exporters of business services were Brazil and Argentina with 74% and 16% of total respectively. The Brazil as the first ranking in Latin America, stands out in exports of architecture and engineering (TRADE MAP, 2014)

Within this context, the aim of this study is to analyze the flow of services from Latin American countries except Cuba, with emphasis on exports of services. To this end services are separated according to Jimenez (2012) into three categories: contact services, shared services and services for skills development.

The contact service is set to lower value-added activities, low level of qualification and limited production integration with local companies. The services in this category are: agribusiness services, transportation, travel, personal cultural services, business service with customer relationship and computing services and networks and applications. The main factor of this segment is associated with the use of natural resources and existence of low operating costs.

Shared services are central to boosting the scaling to a higher added value. The activities have a higher added value and require a medium level of qualification, with limited possibilities for productive integration with local companies. Companies that decide for this service work as unit cost, seeking skilled labor to streamline the operation of the company, with the goal of greater efficiency. These services require all the skills needed by the contact service, and also a workforce that has knowledge in professional technical level of accounting, finance and human resource management. Shared services include construction services, communication, financial, insurance, royalties and licenses, IT and computing and also the business services related to enterprise resource management: architecture, civil engineering, computer science and information technology, accounting and finance.

Services for skills development are related to research and development and information technology, software and consulting services. This segment has the highest added value and the high level of capacity characteristics in international business, mechatronics engineering, nanotechnology and materials research; require highly skilled labor and has an integration with national productivity. The main characteristic of this service is the free

movement of qualified international certifications and a strong bond and a strong local business group with direct links companies in the host country.

The period of analysis are the years 2002 to 2012, and the database is the International Trade Centre, which brings together data from the International Monetary Fund reports, the World Bank, UN, UNCTAD and WTO.

The work is divided as follows: in addition to this introduction, the second topic describes trade in services; the third topic presents the trade flows in Latin America and the fourth the conclusions.

2 TRADE IN SERVICES

The definition of trade in services has been adapted to reality as exchanges of invisible or intangible products and the transfer of knowledge between countries and economic units (BRAZIL, 2010). Given the intangible nature of trade in services, measuring the flow of services and collect statistical data is still a challenge. Overall rates may not be levied on service transactions, except transport and travel. Therefore, the barriers to trade in services are mainly non - tariff, such as quotas, prohibition and government regulations (AMANDOR; CABRAL, 2009).

For the WTO, trade in services comprises different situations involving the borders of transposition: i) Cross-border services - involves the right to provide services between the two countries. There is movement of factors of production nor the recipients of the service. Are similar goods transactions; ii) consumption abroad - refers to services consumed by nationals of a country in another country where the service is provided, and therefore provided to consumers that is not in your country of residence, tourism is an example; iii) commercial presence - when a service provider leaves his country to settle commercially in another country in order to provide a service, which can be through any type of business or professional establishment, as, subsidiaries, affiliates, offices and joint ventures; iv) temporary movement of natural persons - this mode applies only to individuals of a country who settle temporarily in another country in order to provide a service (BRAZIL, 2010).

According to Pereira (2002, p. 545)

"the distinction proposed in trade in services between the modalities commercial presence and cross-border is the same as occurs in trade in

goods. Goods can be traded by international trade flows or through the presence of foreign subsidiaries in the domestic markets. The importance of foreign capital is recorded via direct investment in the balance of payments, and can be produced statistics on the share of sales of foreign affiliates in the domestic market, which would also apply to the service sector".

According to López, Niembro and Ramos (2011) for the service trade are used the balance of payment statistics collected by the International Monetary Fund (IMF) to cover the Cross-border services, and data on FDI to the form of commercial presence. As for consumption abroad and temporary movement of natural person does not have any precise information.

There are some uncertainties about the statistics regarding the actual volumes of trade in services and their effective growth rate. These uncertainties are due to several factors such as: (i) many of these services are new activities for which there is not yet sufficient consensus on the best forms of assessment; (Ii) a large part of export segments is intangible nature, which hinders its registration; (Iii) international services transactions occur in various ways, not always collected completely and homogeneously by statistics.

Part of the increase in world trade flow services reflected by statistics can be attributed to the record by several countries that previously did not do so or to the progress of the measurement and estimation techniques of those who already accounted for. In addition, there is the homogeneity of the data, which makes international comparisons or inter temporal assessment of the available information.

The WTO annually disclose aggregate statistics on foreign trade services, divided into three broad categories: transport, travel and other services. For Lopez, Ramos and Torres (2009) transport services, involving the movement of cargo, passengers and auxiliary services that are performed by residents of one economy to residents of another economy; Travel services are related to the services acquired from an economy by a foreign tourist; communications services involve postcard services, mail and telecommunications; insurance services cover the supply of various types of insurance to non-residents by resident companies; Construction services cover work projects carried out by construction company and employee installation outside the local market; financial services involving financial intermediation; computing and information services include software-related services, data processing, news agencies and the like; royalties and licensing cover franchise fees, royalties, licenses and other proprietary rights; business services comprise the provision of business

services not included in other accounts, such as legal, accounting, architecture and advertising, engineering, research and development, agriculture and services related to rents and marketing; personal, cultural and recreational services include audiovisual services, sports, education and health, and finally government services involving transactions by embassies, consulates, military units and agencies.

3 FLOWS OF TRADE SERVICES IN LATIN AMERICA

According to Appendix A, in 2002 the value of exports to Latin America was 46,815,592 million, and in 2012 exports almost tripled, with a value of 126,163,795 million dollars. The countries that exported more were Brazil, Mexico and Argentina and the least exported Haiti, Nicaragua and Bolivia. The international crisis of 2008 had little effect on the countries for exports of services, with a small reduction in almost all countries in 2009, but exports rose again in 2010. In Appendix B is shown the value of imports of services. Brazil, Mexico and Argentina were the countries that imported more and the least imported were Haiti, Nicaragua and Bolivia. In Appendix C we observe the trade balance of service for each country in Latin America in the years of 2002-2012. Only Panama, Costa Rica, Dominican Republic and Uruguay showed a surplus balance in every year.

As can be seen in Table 1, exports of contact services are superior compared to the shared services in each year of 2002-2012. Also observed a greater focus on contact services in imports of services. In Latin America the total value of imports exceeds the total value of exports, which makes the balance of trade in services deficit.

3.1 Contacts Services

Table 2 show the composition of the contact services, divided into transportation services, travel and cultural and personal. The total value in 2012 amounted to 76,993,948 million dollars. The countries that more exported were Mexico, Brazil and Chile, respectively. Of all the contacts service, can highlight the trip, which refers mainly to tourism, with the highest concentration in almost all countries except Chile, Panama and Paraguay. This service represent 64.67% of total contacts services.

TABLE 1 Latin America: evolution of trade in services, 2002-2012
(in millions of dollars)

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Exports											
Contacts Services	32.103.643	35.693.918	41.882.758	48.208.483	53.340.011	60.335.093	67.924.690	60.343.821	66.376.625	74.223.614	76.993.948
Shared Services	14.711.949	14.845.969	16.014.386	20.231.220	24.436.229	30.829.246	37.909.075	35.246.860	41.501.431	49.829.737	52.776.455
Services for skills development	0	0	0	0	0	0	0	0	0	0	0
Total	46.815.592	50.539.887	57.897.144	68.439.703	77.776.240	91.164.339	105.833.765	95.590.681	107.878.056	124.053.351	129.770.403
Imports											
Contacts Services	38.175.401	38.976.940	46.496.098	55.422.511	62.594.113	76.631.321	90.343.767	77.598.908	95.529.564	113.757.002	118.844.682
Shared Services	23.553.287	25.548.818	26.465.493	31.718.996	35.017.878	41.558.497	50.210.995	57.352.657	67.265.739	81.191.459	86.196.258
Services for skills development	0	0	0	0	0	0	0	0	0	0	0
Total	61.728.688	64.525.758	72.961.591	87.141.507	97.611.991	118.189.818	140.554.762	134.951.565	162.795.303	194.948.461	205.040.940
Balança comercial											
Contacts Services	-6.071.758	-3.283.022	-4.613.340	-7.214.028	-9.254.102	-16.296.228	-22.419.077	-17.255.087	-29.152.939	-39.533.388	-41.850.734
Shared Services	-8.841.338	-10.702.849	-10.451.107	-11.487.776	-10.581.649	-10.729.251	-12.301.920	-22.105.797	-25.764.308	-31.361.722	-33.419.803
Services for skills development	0	0	0	0	0	0	0	0	0	0	0
Total	-14.913.096	-13.985.871	-15.064.447	-18.701.804	-19.835.751	-27.025.479	-34.720.997	-39.360.884	-54.917.247	-70.895.110	-75.270.537

Source: Trade Map (2014)

TABELA 2- Composição das exportações dos serviços de contatos, 2002-2012
(em milhões de dólares)

	Transporte	Viagem	Pessoais, e culturais	Total
Brasil	5.421.923	6.644.864	42.927	12.109.714
México	960.870	12.739.391	80.000	13.780.261
Argentina	2.342.241	4.886.652	344.781	7.573.674
Chile	6.477.810	2.150.490	31.046	8.659.346
Colômbia	1.481.600	2.354.148	84.517	3.920.265
Peru	1.222.676	2.657.229	10.040	3.889.945
Panamá	4.723.400	3.066.700	0	7.790.100
Equador	413.373	1.032.524	101.282	1.547.179
Uruguai	594.514	2.076.352	1.929	2.672.795
Guatemala	320.054	1.418.910	2.812	1.741.776
Republica Dominicana	427.500	4.736.300	0	5.163.800
Costa Rica	452.971	2.299.625	260	2.752.856
Bolívia	167.441	531.722	1.286	700.449
El Salvador	408.814	557.990	0	966.804
Honduras	78.877	660.700	6.563	746.140
Nicarágua	45.000	421.500	0	466.500
Haiti	0	446.835	0	446.835
Paraguai	293.009	264.500	0	557.509
Venezuela	656.000	844.000	8.000	1.508.000
Total	26.488.073	49.790.432	715.443	76.993.948
Porcentagem de cada serviço	34.4	64.67	0.93	

Fonte: Trade Map (2014)

By analyzing table 2.1, the average annual growth rate of personal travel is superior to business, 7.9% and 7.5%, respectively. In relation to personal travel, stands out with the highest average annual rate, related to education services with 10.1% and health with 5.2%. All countries exported travel services in 2002-2012. Mexico had greater representation, followed by Brazil, Dominican Republic and Argentina. In business services the countries that more exported were Mexico, Argentina, Venezuela and Chile and related to personal travel services were Mexico, Brazil, Dominican Republic and Argentina.

The transportation service was a representation of 34.40% of total contacts services. The countries with the highest export value were Chile, Brazil and Panama and Argentina. The shuttle showed an annual growth of 11.9% with a higher share of Mexico and Chile; air transport by 8.2% load with greater participation of Uruguay, Argentina, Brazil and Colombia and the passenger a 9.4% stake. Brazil was the most exported marine services by loads followed by Panama, Chile and Argentina.

Exports of personal and cultural services (services related to culture, recreational services, audiovisual, education and health) totaled 715,443 million dollars in 2012, which accounted for 0.93% of total contacts services. (Table 2). The countries with greater representation were Argentina, Ecuador and Mexico, respectively. In Table 2.1 we observe that this service had the lowest average growth rate, with only 2.3% annual.

In business services, with lower added value was not possible to verify its weight due to aggregation of data. Agricultural services and mining, accounted for as a part of business services, have an average annual growth rate of 101.6%. Only Brazil, Argentina and Costa Rica exported such services.

3. 2 Shared services

In 2012, exports of shared services totaled 49,167,847 million (Table 3). The country with the largest representation was Brazil with more than half of total exports, followed by Argentina and Chile. Shared services which were more exported were business, IT and computing, and financial.

The communication service had a share of 6.54% of the total shared services with Brazil, Panama and Guatemala countries that exported more this service and Paraguay, Costa Rica and Haiti the least exported. This service had an average annual growth rate of 5.9% (Table 3.1). In the e-mail and messaging services, Argentina stood out for higher volume exported followed by Venezuela. The telecommunication service the highlights were Mexico, Brazil and Colombia (table 3.2).

With regard to building service, Argentina is the largest exporter, beating Brazil in 2012. This was the service with the lowest representation, with 12.16% of total exports of shared services. The average annual growth rate of the construction service exports in Latin America was 6.0% (Table 3.1).

In insurance, Mexico was the country that exported more, followed by Brazil and Peru. Costa Rica, Haiti and Ecuador had no exports in 2012. This service represented 7:54% of all shared services. In Table 3.1, it appears that the insurance service had an average annual growth rate of 10.3%. El Salvador, Ecuador, Panama exported services of life insurance and pension fund.

TABELA 2.1- América Latina: taxa de crescimento anual das exportações de serviços de contatos, 2003-2012

(em porcentagem)

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Média anual
1-Transporte	14,8	22,0	20,1	12,0	14,8	20,7	-18,1	16,7	16,6	-0,9	11,9
1.1-Transporte marítimo	15,1	26,4	22,0	9,6	14,6	26,2	-43,8	14,7	16,2	0,4	10,1
1.1.2- Carga	14,7	28,6	19,2	3,2	19,5	20,9	-61,1	19,3	10,8	-4,5	7,1
1.1.3- Outros	15,3	25,3	23,8	13,3	11,9	29,3	-34,1	13,2	18,1	1,9	11,8
1.2- Transportes aéreos	14,9	14,9	18,2	13,0	13,4	14,6	-36,4	2,5	16,6	9,5	8,1
1.2.1- Passageiro	15,9	13,1	21,9	16,0	13,7	13,5	-25,3	-3,1	13,1	15,4	9,4
1.2.2- Carga	18,0	30,4	11,6	8,7	20,9	21,7	-70,8	27,5	14,3	-0,5	8,2
1.2.3- Outros	10,2	9,7	12,2	6,9	6,3	11,8	-28,7	16,7	30,7	-3,3	7,3
1.3-Outros transportes	12,5	29,2	17,0	23,3	21,7	13,5	-32,5	25,2	17,7	-0,2	12,7
1.3.1- Passageiros	22,2	7,1	13,4	12,2	8,0	19,1	-15,1	18,0	21,5	-18,0	8,8
1.3.2- Carga	15,0	44,7	20,2	10,6	21,8	15,3	-44,2	29,5	20,5	3,2	13,7
1.3.3- Outros	0,1	-1,4	5,5	96,4	28,1	6,4	-6,6	20,7	9,5	2,8	16,2
1.4- Transportes carreteiros	3,3	41,0	18,4	9,8	21,5	13,4	-24,9	24,2	16,0	-3,1	12,0
1.4.1- Carga	1,3	65,7	21,7	10,3	20,8	12,5	-33,2	28,7	15,5	2,4	14,6
2-Viagens	10,2	15,4	12,9	9,9	12,7	8,8	-6,8	6,5	9,4	6,5	8,6
2.1- Viagens de negócios	27,5	-26,1	22,4	4,9	22,5	13,4	-29,7	15,8	14,0	10,7	7,5
2.1.1- Gastos de trabalhadores com temporada	-39,9	-10,4	0,7	15,8	13,8	-7,3	-25,6	-13,3	3,6	27,8	-3,5
2.1.2- Outros	38,6	-29,1	21,3	5,5	37,8	13,9	-29,7	16,4	14,2	10,4	9,9
2.2- Viagens pessoais	8,4	20,5	12,2	10,3	11,9	8,4	-13,9	6,2	9,1	5,5	7,9
2.2.1- Saúde	-21,7	29,0	32,2	-0,1	18,8	0,7	-16,9	9,5	0,7	-0,8	5,2
2.2.2- Ensino	0,5	8,4	18,7	2,8	10,8	15,9	-4,4	23,5	16,3	8,1	10,1
2.2.3- Outros	11,4	17,3	12,3	10,6	11,7	9,0	-11,4	6,0	9,2	5,5	8,2
3- Serviços pessoais, culturais e recreativos	-7,4	14,6	13,0	13,6	-2,6	0,1	-36,7	26,6	2,2	0,0	2,3
3.1- Audiovisuais	-14,3	16,9	11,1	10,8	-2,8	-5,6	-30,0	11,0	11,2	-0,6	0,8
3.2- Outros serviços	15,2	33,8	26,8	39,8	-9,7	16,0	-25,6	121,1	-23,7	5,2	19,9
3.2.1- Saúde	0	0	0	0	0	0	0	-100	0	0	-33,3
3.2.2- Ensino	0	0	0	0	0	0	0	0	0	0	0
4- Serviços agrícolas e mineração	-14,3	-100,0	0	264,0	398,0	201,5	-73,1	75,5	90,9	72,3	101,6

Fonte: Trade Map (2014)

TABELA 2.2- Participação média das exportações dos serviços de contatos por país, 2002-2012
(em porcentagem)

	Argentina	Bolivia	Brasil	Chile	Costa Rica	Colômbia	El Salvador	Equador	Guatemala	Haiti	Honduras	México	Nicarágua	Panamá	Paraguai	Peru	República Dominicana	Uruguai	Venezuela
1- Transporte	8,3	0,6	20,5	26,4	1,6	5,4	1,8	1,8	1,1	0	0,3	6,5	0,2	14,1	0,8	3,5	1,5	2,6	2,7
1.1- Transportes marítimos	6,0	0	36,7	19,2	0,6	1,9	0,2	3,6	0,6	0	0,4	0,8	0,1	22,5	0	1,8	1,0	0	4,7
1.1.1- Carga	2,3	0	40,0	36,7	0	1,5	0	9,6	0,0	0	0	0	0	0	0	0,0	1,9	0	7,8
1.1.2- outros	7,7	0	35,2	10,8	0,8	2,1	0,3	0,7	0,8	0	0,7	1,1	0,1	33,1	0	2,7	0,6	0	3,2
1.2- Transportes aéreos	12,9	1,3	8,8	14,3	3,9	12,9	3,3	0,6	0,3	0	0,2	19,3	0,2	11,7	0,2	8,3	0,1	0	1,6
1.2.1- Passageiro	12,5	1,4	6,3	8,7	4,3	13,1	7,1	0,1	0,0	0	0,1	21,5	0	15,8	0,3	7,3	0	0	1,5
1.2.2- Carga	1,1	0,1	24,4	47,2	0,0	14,7	0,5	2,8	0,0	0	0	0	0	2,3	0	6,0	0,6	0	0,2
1.2.3- Outros	21,2	1,9	6,1	10,2	4,6	10,1	0,7	0,7	1,2	0	0,7	22,9	0,9	3,3	0	12,6	0,3	0	2,8
1.3- Outros transportes	17,6	1,8	9,0	9,2	1,8	4,0	0,1	0	2,3	0	0,3	0	0,5	0	9,6	0	12,1	31,7	0
1.3.1- Passageiros	14,9	3,1	0,5	5,1	1,5	0	0,7	0	1,9	0	0,4	0	0,0	0	4,1	0	0,0	67,7	0,0
1.3.2- Cargas	25,1	2,2	11,3	10,2	2,5	6,4	0	0	3,3	0	0,4	0	0,9	0	11,5	0	0	26,2	0
1.3.3- Outros	0	0,2	7,0	8,6	0,1	0,0	0,2	0	0,2	0	0,0	0	0	0	7,2	0	48,3	28,3	0
1.4- transportes por carretas	24,4	0,8	12,5	0	2,5	5,6	0,2	0	3,2	0	0,5	0	0,7	0	5,4	0	0	44,1	0
1.4.1- Cargas	30,6	0,5	13,8	0	3,1	7,8	0	0	4,0	0	0,5	0	1,0	0	6,6	0	0	32,0	0
2- Viagens	9,9	0,7	12,6	3,9	4,9	4,4	1,1	1,7	2,8	0,5	1,4	31,5	0,7	3,7	0,4	4,6	10,4	2,8	2,0
2.1- Viagens de negócios	23,7	2,8	2,5	7,3	0,1	0	1,7	5,8	3,4	0	7,1	25,0	0,0	9,0	0	0	0,7	0	10,9
2.1.1- Gastos de trabalhadores com temporada	0	0	0	0,0	0	0	0	0	0	0	0	68,7	0	0	0	0	31,3	0	0
2.1.2- Outros	25,2	3,0	2,6	7,8	0,2	0	1,8	6,2	3,6	0	7,6	25,0	0,0	9,6	0	0	0	0	7,5
2.2- Viagens pessoais	9,1	0,6	14,0	1,7	5,5	5,0	0,6	1,5	1,3	0,6	1,0	33,5	0,4	3,4	0,4	5,2	11,7	3,2	1,3
2.2.1- Saúde	0	0	8,9	0	1,3	0	1,9	0	0,0	0	0	84,3	0	0,3	0	0	0	0	3,2
2.2.2- Educação	0	0	8,8	0	36,2	0	0,4	0	0,2	0	0	15,9	0	2,2	0	0	34,1	0	2,2
2.2.3- Outros	9,5	0,6	14,3	0	5,4	5,2	0,6	1,5	1,4	0,6	1,0	33,7	0,4	3,5	0,4	5,4	11,8	3,3	1,3
3- Serviços pessoais, culturais e recreativos	36,4	0,2	8,7	7,5	0,0	6,8	0,0	7,1	0,2	0	0,3	31,2	0	0,0	0,2	0,4	0	0,1	0,8
3.1- Audiovisuais	43,5	0,2	3,6	0	0,0	4,3	0,0	8,8	0,0	0	0	38,7	0	0	0	0	0	0	0,8
3.2- Outros serviços	10,6	0,3	46,6	0	0,0	27,4	0,0	0	1,8	0	2,7	0	0	3,9	1,4	3,0	0	1,1	1,0
3.2.1- Ensino	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.2.1- Outros	0	0,4	0	0	0,0	82,1	0	0	0,3	0	0	0	0	0	4,2	8,9	0	3,2	0,9
4- Agrícola e mineração	16,3	0	78,9	0	4,7	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Fonte: TradeMap(2014)

In Freight insurance services, the main exporters were Guatemala, Brazil and Panama. Mexico, Honduras and Peru were the main exporters of reinsurance service. Ancillary services were exported by Brazil, Paraguay and Argentina (Table 3.2). In financial services, Brazil has more than half of the total contribution, followed by Panama and Chile. The average annual growth rate of exports in the 2003-2012 was 18.6% (Table 3.1).

Regarding the IT service and computing Argentina participated with 36.6% of the total and Costa Rica with 38.0%. Mexico, Ecuador, and Haiti did not export this service. Table 3 shows that this service had a share of 9.90% of the total shared services. The average annual growth rate was 27.8% (Table 3.1).

TABELA 3- Composição das exportações dos serviços compartilhados, 2002-2012
(em milhões de dólares)

	Comunicação	Construção	Seguros	Financeiros	Informação e computação	Royalties e licenças	Empresariais	Total
Brasil	380.664	23.625	540.699	2.683.724	596.321	510.712	21.275.748	26.011.493
México	254.767	0	2.014.879	0	0	95.626	0	2.365.272
Argentina	233.667	37.455	44.680	8.905	1.721.335	160.772	5.127.481	7.334.295
Chile	158.913	0	352.932	430.809	205.715	75.409	2.448.730	3.672.508
Colômbia	294.460	0	930	54.515	66.548	89.761	742.547	1.248.761
Peru	146.883	0	361.425	59.491	45.916	11.517	469.145	1.094.377
Panamá	325.700	4.200	154.100	675.800	34.300	12.100	253.164	1.459.364
Equador	143.852	0	0	0	0	0	0	143.852
Uruguai	36.565	0	8.301	127.862	179.115	430	323.517	675.790
Guatemala	288.343	2.530	-3.708	26.633	32.709	15.738	209.235	571.480
República Dominicana	199.600	0	35.000	47.300	32.400	0	160.700	475.000
Costa Rica	24.797	0	0	33.604	1.830.988	4.400	806.137	2.699.926
Bolívia	79.630	546	95.507	3.621	34.602	8.525	19.314	241.745
El Salvador	94.617	10.502	47.680	22.014	66.942	17.650	38.957	298.362
Honduras	222.985	0	28.691	129	8.109	0	22.648	282.562
Nicarágua	148.400	0	4.900	0	800	0	11.200	165.300
Haiti	25.500	0	0	0	0	20.460	0	45.960
Paraguai	13.000	0	20.000	2.700	400	0	2.700	38.800
Venezuela	142.000	0	2.000	0	12.000	0	187.000	343.000
Total	3.214.343	78.858	3.708.016	4.177.107	4.868.200	1.023.100	32.098.223	49.167.847
Porcentagem do total	6,54	0,16	7,54	8,50	9,90	2,08	65,28	

TABELA 3.1- América Latina: taxa de crescimento anual das exportações de serviços de contatos, 2003-2012
(em porcentagem)

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Média anual
1- Comunicação	11,2	6,5	9,7	6,7	9,6	17,7	-12,0	7,7	-2,5	4,2	5,9
1.1- E-mail e mensagens	-3,5	30,3	7,0	30,8	18,8	13,8	-3,2	8,5	-9,2	3,7	9,7
1.2- Telecomunicação	16,1	5,7	11,5	6,0	9,3	16,9	-12,0	8,0	-2,8	5,1	6,4
2- Construção	9,3	5,0	-7,2	19,5	-15,7	12,6	-31,3	103,8	-33,2	-3,1	6,0
3- Seguros	-8,5	-19,9	58,1	-2,1	57,4	9,8	-23,1	9,7	22,0	0,0	10,3
3.1- Seguros de vida e fundo pensão	28,9	52,2	-17,6	4,9	-22,0	33,9	138,3	0,0	-36,2	7,1	18,9
3.2- seguros de transportes de cargas	-32,1	13,9	24,8	-22,0	66,4	9,5	-61,0	68,0	-38,8	22,2	5,1
3.3- Resseguros	-9,0	-22,5	62,4	-18,5	61,8	-1,1	-17,9	6,4	27,2	-1,9	8,7
3.4- serviços auxiliares	-18,7	6,1	108,7	-16,1	23,3	600,5	-68,0	-33,0	47,8	77,8	72,8
4- Financeiro	-0,2	2,1	9,0	39,4	35,5	15,4	21,6	34,1	27,4	1,6	18,6
5- Informática e computação	15,1	30,3	23,9	47,4	39,2	31,9	11,6	35,7	25,0	18,2	27,8
5.1- Informática	14,2	39,6	25,7	53,1	40,2	33,0	10,0	36,1	25,8	18,6	29,6
6- Royalties e Licença	16,3	- 0,4	-10,1	24,6	44,6	19,7	-22,1	5,0	32,6	-2,1	10,8
6.1- Franquias e deveres similares	0	0	104,5	75,5	36,7	10,2	-100	0	0	0	25,4
7- Serviços empresariais	-0,8	15,8	33,1	25,2	27,9	27,3	-7,8	18,0	21,8	6,4	16,7
7.1- Merchanting e outros serviços relacionados com comercio	0,1	4,4	90,7	30,7	9,4	28,6	-30,6	-20,0	7,8	-5,0	11,6
7.1.1- Merchanting	2,5	5,5	38,2	39,4	-51,3	17,8	-28,0	-17,5	0,1	4,1	1,1
7.1.2- Outros serviços relacionado ao comércio	-40,4	-26,6	-60,3	-17,1	7,4	-15,4	0,0	0,0	0,0	0,0	-15,2
7.2- Serviços de concessão de exploração	-8,6	42,0	78,3	32,4	-3,1%	34,8	-41,5%	25,6	-25,2	-14,7	12,0
7.3- Serviços empresariais, profissionais e técnicos	-2,4	18,3	42,3	23,9	32,7%	26,9	-10,0%	19,4	23,7	7,9	18,3
7.3.1- Serviços jurídicos, contábeis, administrativos e relações públicas	16,4	20,4	121,0	109,6	34,2%	31,0	-12,9%	39,9	18,7	7,9	38,6
7.3.1.1- Serviços jurídicos	13,4	20,9	125,1	131,8	37,7%	36,1	-60,7%	60,7	24,3	6,8	39,6
7.3.2- Publicidade, investigação de mercados e relações públicas	4,5	29,9	49,7	37,7	18,7%	43,4	-5,1%	28,9	32,1	0,1	24,0
7.3.3- Arquitetura, engenharia e outros serviços técnicos	-3,2	32,5	36,2	12,9	35,8%	34,6	-0,5%	2,1	29,6	19,4	19,9
7.3.4- Outros serviços empresariais	-2,0	6,0	22,7	7,6	42,8%	29,7	-9,2%	21,6	27,5	-0,7	14,6

TABELA 3.2- Participação média das exportações dos serviços de contatos por país, 2002-2012
(Em porcentagem)

	Argentina	Bolívia	Brasil	Chile	Costa Rica	Colômbia	El Salvador	Equador	Guatemala	Haiti	Honduras	México	Nicarágua	Panamá	Paraguai	Peru	República Dominicana	Uruguai	Venezuela
1- Comunicação	9,1	1,9	11,8	5,9	1,3	8,4	5,0	4,7	7,1	0,5	6,2	13,6	2,5	7,2	0,6	3,3	5,9	1,0	4,1
1.1- Email e mensagens	30,3	1,0	11,0	0	2,6	4,4	5,3	0	0,7	0	1,3	0	0,1	0,9	0,6	0	11,0	2,4	28,3
1.2- Telecomunicação	8,3	2,1	12,7	0	1,3	9,2	5,3	5,3	8,0	0,6	7,0	15,5	2,8	8,0	0,6	3,8	6,0	1,0	2,7
2- Construção	45,3	0,5	19,4	0	0	0	26,3	0	6,8	0	0,3	0	0	1,3	0	0	0	0	0
2.1- Construções no exterior	48,2	0,5	20,7	0	0	0	27,7	0	2,5	0	0	0	0	0,3	0	0	0	0	0
3- Seguros	0,4	1,9	14,2	8,4	0	0,0	1,4	0,0	0,0	0	0,8	61,4	0,1	2,4	0,8	7,0	0,8	0,3	0,1
3.1- Seguros de vida e fundo pensão	0	0	0	0	0	0	42,2	1,0	0	0	0	0	0	56,8	0	0	0	0	0
3.2- Seguros de Carga	0	0	19,4	0	0	0,0	0,7	0	43,7	0	0	0	15,7	16,2	0	0	0	5,0	0
3.3- Resseguros	0,0	2,6	3,0	0	0	0	0	0	0,5	0	18,0	82,1	0	0,9	0,5	9,4	0	0,3	0,1
3.4- serviços auxiliares	8,8	0	62,5	0	0	0	0	0	0	0	0	0	0	0	10,7	0	0	0	0
4- Financeiros	0,3	0,4	61,7	7,8	0,8	2,4	0,3	0	0,6	0	0,1	0	0	18,6	0,2	1,7	1,0	4,1	0,0
5- Informática e computação	38,5	0,2	8,6	6,0	35,0	1,8	0,3	0	0,6	0	0,1	0	0,0	0,9	0,1	0,7	0,9	6,0	0,4
5.1- Informática	41,6	0,1	8,8	0	37,9	1,6	0,3	0	0,6	0	0,1	0	0,0	1,0	0,1	0	0,9	6,4	0,5
6- Royalties e Licença	13,6	0,4	42,2	8,2	0,3	4,2	0,3	0	1,2	0,6	0,0	7,2	0	0,4	20,9	0,4	0	0,0	0
6.1- Franquias e deveres similares	0	0	0	0	0	0	0	0	100	0	0	0,0	0	0	0	0	0	0	0
6.2- Outros Royalties e licença	0	1,1	0	0,0	0	16,0	0,2	0	0,0	2,2	0,0	0,0	0,0	0,0	78,9	1,5	0,0	0,1	0
7- Serviços empresariais	16,0	0,1	63,4	8,1	3,0	2,2	0,2	0	0,7	0	0,1	0,2	0,0	1,5	0,9	1,5	0,5	0,9	0,8
7.1- Merchanting e outros serviços relacionados com comercio	10,2	0,1	52,0	12,5	10,4	7,0	0,3	0	0,2	0	0,1	0	0	2,5	4,6	0	0	0	0
7.1.1- Merchanting	20,8	0,2	29,1	0	21,2	14,2	0	0	0	0	0,2	0	0	5,1	9,2	0	0	0	0
7.1.2- Outros serviços relacionados com o comércio	0	0	0	0	0	0	47,9	0	37,4	0	0,4	0	0,0	0	14,3	0	0,0	0	0,0
7.2- serviços de concessão de exploração	55,0	1,9	17,1	18,3	3,8	2,7	0	0	0,2	0	0,9	0	0,0	0,1	0,0	0,0	0,0	0,0	0,0
7.3- serviços empresariais, profissionais e técnicos	16,9	0,0	70,2	1,6	2,3	1,8	0,1	0	0,4	0	0,1	0,2	0,0	1,5	0,5	1,8	0,6	1,1	0,9
7.3.1- Jurídicos, contábeis, administrativos e relações públicas	35,8	0	51,6	0	7,4	1,3	0	0	0,0	0	0	0	0,0	3,9	0,0	0	0	0	0
7.3.1.1- Serviços jurídicos	56,9	0	36,9	0	0	0	0	0	0,0	0	0	0	0,0	6,1	0	0,0	0	0	0
7.3.1.2- Contabilidade e auditoria	0	0	0	0	0	0	0	0	0	0	0	0	0,0	0	0	0	0	0	0
7.3.2- Publicidade, investigação de mercados e relações públicas	47,8	0	46,3	0	0,4	4,9	0,1	0	0,4	0	0	0	0	0,2	0	0	0	0	0
7.3.3- Investigação e desenvolvimento	50,0	0	49,2	0	0,8	0	0	0,0	0	0,0	0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
7.3.4- Arquitetura, engenharia e outros serviços técnicos	3,7	0	91,7	0	0,0	3,1	0	0	0	0	0	0	0,0	0,1	0,2	0	0	0	1,1
7.3.5- Outros serviços empresariais	8,0	0,0	68,8	0	2,3	0,3	0,3	0	1,3	0	0,1	0,7	0,0	2,3	1,5	6,3	2,1	4,0	1,9

Fonte: Trade Map (2014)

In Royalties & License Services, Brazil stands out for having the largest representation in exports. The average annual growth rate for this service was 10.8% (Table 3.1). Business services were the most exported by Latin America in 2012, with the value of 32,098,223 million, representing 65.28% of shared services. The largest exporters in 2012 were Brazil and Argentina (Table 3). The average annual growth rate (table 3.1), was 16.7% .

Table 1 summarizes the main information on imports and exports of services in each country in Latin America. Can be observed that exports of contact services are concentrated in travel and transport services in all countries (except Cuba) and shared services in business, communication, financial services and insurance. Imports of contact services are basically transport and travel to all countries; and shared services in most countries correspond to business and insurance. Competence development services showed no records of exports and imports in Latin America during these years. Regarding the trade balance, this presents a deficit every year in most countries.

4 CONCLUSION

By analyzing the flow of services from Latin American countries except Cuba, divided into three categories: contact services, shared services and services for skills development, are found that:

i) In the year 2012, contacts services were marketed more towards shared services. There has been a marked concentration in the category of travel, which refers mainly to tourism, with emphasis on Mexico and Brazil, and services shared the highlights were, Brazil and Argentina with a large stake in the business services, informatics and information and financial .

ii) In the years 2002 to 2012, the trade balance of services in Latin America was deficient, however in an analysis by country, only Panama, Costa Rica, Dominican Republic, Uruguay have a surplus balance in services every year.

Generally countries with large volume of exports of services have further increased volumes of service imports, thus presenting deficit trade balance. The possibility to increase exports and reduce deficits is one of the main reasons which justify specific public policies for this sector.

QUADRO 1- Summary of imports and exports in Latin America, 2002-2012

	Exports		Imports		Trade balance	
	Contacts Services	Shared services	Contacts Services	Shared Services	Shared Services	Contacts Services
Brazil	Travel and transport	Business and financial	Travel and transport	Business, IT and computing	Deficits	Deficits
México	Travel and transport	Insurance and communication	Travel and transport	Insurance, royalties and licenses	Deficits	Deficits
Argentina	Travel and transport	Business and IT and computing	Travel and transport	Business, royalties and licenses	Déicits	Deficits and surpluses
Chile	Travel and transport	Business and insurance	Travel and transport	Business and insurance	Deficits and Surpluses	Deficits
Panama	Travel and transport	Financial and communications	Travel and transport	Business and financial	Surpluses	Surpluses
Dominican Republic	Travel and transport	Communications and business	Travel and transport	Business and insurance	Surpluses	Deficits
Colombia	Travel and transport	Communications and business	Travel and transport	Business and insurance	Deficits	Déicits
Costa Rica	Travel and transport	Business and IT and computing	Travel and transport	Business and insurance	Surpluses	Surpluses
Peru	Travel and transport	Business and insurance	Travel and transport	Business and insurance	Deficits	Deficits
Uruguai	Travel and transport	Business and IT and computing	Travel and transport	Business and insurance	Surpluses	Surpluses
Guatemala	Travel and transport	Communications and business	Travel and transport	Business and insurance	Deficits	Surpluses
Venezuela	Travel and transport	Business and insurance	Travel and transport	Communications and business	Deficits	Deficits
Ecuador	Travel and transport	Insurance and communication	Travel and transport	Business and insurance	Deficits	Deficits
El salvador	Travel and transport	Insurance and communication	Travel and transport	Business and insurance	Deficits	Deficits and surpluses
Honduras	Travel and transport	Insurance and communication	Travel and transport	Business and insurance	Deficits	Surpluses
Paraguay	Travel and transport	Insurance and communication	Travel and transport	Insurance and financial	Deficits	Surpluses
Bolívia	Travel and transport	Insurance and communication	Travel and transport	Business and insurance	Deficits	Deficits
Nicarágua	Travel and transport	Communications and business	Travel and transport	Business and insurance	Deficits	Deficits and surpluses
Haiti	Travel	Communication and royalties and licenses	Travel and transport	Communications and financial	Deficits	Deficits and surpluses

Fonte: Elaboração própria

Services related to international travel are the most significant in deficits in most countries. The increase in the deficit on international travel is problematic because trips are not direct inputs to add value or product differentiation, being much related to leisure and entertainment.

Of the twelve countries with trade balance surplus, all belong to the region of Central America (except Argentina, Chile, Uruguay and Paraguay). Thus the region of Central America has great potential for the production of services and therefore for export. Although the database can not identify the destination of exports, it is assumed that in view of strong economic bond of the countries of central region with the United States most of the exports of services in this region are aimed at Americans.

For South America one policy to increase exports could be to incorporate services into goods in order to create new types of trade specialization. The incorporation of services into commodities (servitization) could be a complementary approach to their industrial processing. This strategy yield benefits also in terms of employment creation, technical progress, product diversification and quality improvement.

iii) Although travel and transport (contact services) have the largest shares, the rates of growth of shared services indicate changes in the region. These changes may be related to the growth (upgrading) of manufacturing activities related to FDI and also with FDI inflows linked to offshoring of various services. Thus, the participation of Latin America in the value chain in services can be crucial for their development.

The challenge is the competitiveness of exports of services to improve the ability of countries to attract or retain in its territory the segments of higher value-added services. To this end, countries should expand institutions to encourage the growth of exports of services. Institutions to develop services should facilitate the creation of specific instruments and public goods category, as an inexpensive common telecommunications infrastructure and transport, access to skilled labor with international certificates and agreements that allow free qualified labor movement

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APÊNDICES

APÊNDICE A - EVOLUÇÃO DAS EXPORTAÇÕES DE SERVIÇOS POR PAÍS, 2002-2012

(em milhões de dólares)

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Total
Brasil	9.551.360	10.447.000	12.583.600	16.047.500	19.462.400	23.954.300	30.450.500	27.728.300	31.598.900	38.209.116	39.863.625	259.896.601
México	12.508.000	12.397.300	13.661.100	15.666.400	15.827.200	17.149.300	17.575.400	14.824.327	15.234.506	15.581.942	16.145.533	166.571.008
Argentina	3.495.400	4.499.910	5.288.150	6.634.430	8.022.860	10.363.200	12.155.800	10.967.000	13.648.018	15.609.933	15.107.384	105.792.085
Venezuela	1.013.000	878.000	1.114.000	1.342.000	1.544.000	1.844.000	2.170.000	2.227.000	1.858.000	1.993.000	2.205.000	18.188.000
Chile	4.385.540	5.069.530	6.033.690	7.134.070	7.830.420	8.962.300	10.823.500	8.492.830	11.148.700	13.105.300	12.455.597	95.441.477
Colômbia	1.867.320	1.921.100	2.258.150	2.667.530	3.377.200	3.636.020	4.137.290	4.140.576	4.376.462	4.766.346	5.263.905	38.411.899
Peru	1.455.040	1.715.590	1.993.280	2.289.200	2.660.080	3.152.090	3.648.790	3.635.577	3.692.748	4.364.353	5.129.911	33.736.659
Panamá	2.277.900	2.539.600	2.793.700	3.231.300	4.000.200	4.958.100	5.787.900	5.542.200	6.438.800	8.075.400	9.348.264	54.993.364
Equador	883.922	881.152	1.013.950	1.012.120	1.036.530	1.200.090	1.441.620	1.336.520	1.472.472	1.587.470	1.810.166	13.676.012
Guatemala	1.145.380	1.058.800	1.100.400	1.307.800	1.518.900	1.731.200	1.872.900	2.088.372	2.267.444	2.238.624	2.430.243	18.760.063
Uruguai	771.330	771.342	1.111.560	1.311.280	1.387.430	1.833.450	2.276.740	2.319.466	2.688.159	3.587.608	3.383.075	21.441.440
Republica Dominicana	3.070.800	3.468.800	3.503.900	3.935.000	4.567.200	4.824.900	4.951.200	4.849.000	5.153.900	5.429.800	5.764.700	49.519.200
Bolívia	256.596	363.862	416.417	488.824	476.621	499.385	499.680	515.490	549.622	800.880	962.756	5.830.133
Costa Rica	1.868.160	2.021.040	2.241.830	2.621.560	2.971.660	3.552.160	4.083.320	3.592.910	4.319.982	4.972.889	5.482.637	37.728.148
Honduras	541.961	591.132	644.674	699.556	744.938	780.716	885.385	945.787	975.557	1.022.981	1.066.327	8.899.014
El Salvador	783.300	948.292	1.089.610	945.730	1.014.900	1.133.960	1.058.050	862.898	975.958	1.073.155	1.326.676	11.212.529
Nicarágua	225.500	257.600	285.800	308.500	345.400	373.600	526.300	563.400	577.600	663.100	719.300	4.846.100
Haiti	146.670	136.010	135.740	140.970	190.240	253.670	339.450	378.870	239.010	249.160	548.995	2.758.785
Paraguai	568.413	573.827	627.593	655.933	798.061	961.898	1.149.940	580.158	662.218	722.294	756.309	8.056.644
Total	46.815.592	50.539.887	57.897.144	68.439.703	77.776.240	91.164.339	105.833.765	95.590.681	107.878.056	124.053.351	126.161.795	955.759.161

Fonte: Trade Map, 2002-2012

APÊNDICE B - EVOLUÇÃO DAS IMPORTAÇÕES DE SERVIÇOS POR PAÍS, 2002-2012

(em milhões de dólares)

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Total
Brasil	14.508.600	15.378.100	17.260.200	24.356.100	29.116.100	37.172.900	47.140.400	46.973.700	62.434.004	76.161.088	80.939.016	451.440.208
México	17.246.500	17.762.700	19.319.000	20.823.400	22.114.900	23.298.500	24.525.700	24.901.474	25.631.268	30.205.348	30.487.600	256.316.390
Argentina	4.955.620	5.693.020	6.619.140	7.625.960	8.523.470	10.875.800	13.439.900	12.252.300	14.807.978	17.856.850	18.473.206	121.123.244
Venezuela	3.922.000	3.512.000	4.497.000	5.339.000	5.954.000	9.804.000	11.958.000	12.176.000	13.055.000	15.690.000	18.164.000	104.071.000
Chile	5.087.010	5.687.530	6.779.560	7.755.620	8.461.820	9.949.700	11.787.400	10.503.300	13.028.600	16.158.300	14.731.900	109.930.740
Colômbia	3.302.030	3.360.220	3.937.850	4.769.790	5.495.800	6.242.960	7.209.700	7.023.140	8.069.510	9.503.042	10.766.683	69.680.725
Peru	2.448.830	2.615.540	2.725.110	3.123.470	3.397.280	4.344.070	5.704.400	4.811.574	6.038.232	6.496.831	7.387.931	49.093.268
Panamá	1.309.800	1.299.800	1.457.000	1.811.400	1.727.700	2.121.800	2.632.500	2.200.900	2.798.300	4.142.500	4.183.900	25.685.600
Equador	1.599.860	1.624.480	1.967.570	2.141.950	2.341.270	2.571.560	3.013.020	2.618.310	2.998.406	3.150.171	3.216.647	27.243.244
Guatemala	1.066.050	1.126.120	1.344.300	1.449.600	1.778.400	2.041.200	2.149.000	2.024.253	2.299.200	2.388.337	2.415.464	20.081.924
Uruguai	618.051	636.297	786.072	939.478	978.679	1.130.010	1.523.340	1.294.694	1.530.925	2.039.816	2.323.645	13.801.007
República Dominicana	1.313.500	1.219.400	1.213.170	1.478.200	1.582.010	1.772.400	1.989.400	1.857.000	2.185.000	2.235.000	2.283.500	19.128.580
Bolívia	433.295	551.240	606.671	682.524	826.578	899.656	1.017.150	1.015.300	1.151.910	1.660.660	2.000.488	10.845.472
Costa Rica	1.183.010	1.244.650	1.384.460	1.505.600	1.620.600	1.818.110	1.882.400	1.404.810	1.782.750	1.780.269	2.003.034	17.609.693
Honduras	731.922	753.191	848.868	928.817	1.035.680	1.068.780	1.213.110	963.943	1.168.858	1.446.187	1.512.342	11.671.698
El Salvador	1.023.000	1.055.110	1.154.070	1.074.620	1.179.000	1.275.060	1.270.980	953.050	1.069.857	1.150.236	1.187.219	12.392.202
Nicarágua	355.400	376.800	409.000	448.200	501.500	656.500	750.100	665.300	721.600	840.800	921.800	6.647.000
Haiti	269.620	300.960	351.550	544.370	593.360	683.490	756.640	772.100	1.277.260	1.140.160	1.116.019	7.805.529
Paraguai	354.590	328.600	301.000	343.408	383.844	463.322	591.622	540.417	746.645	902.866	926.546	5.882.860
Total	61.728.688	64.525.758	72.961.591	87.141.507	97.611.991	118.189.818	140.554.762	134.951.565	162.795.303	194.948.461	205.040.940	1.340.450.384

Fonte: Trade Map, 2002-2012

APÊNDICE C - BALANÇA COMERCIAL DE SERVIÇOS POR PAÍS, 2002-2012

(em milhões de dólares)

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Panamá	968.100	1.239.800	1.336.700	1.419.900	2.272.500	2.836.300	3.155.400	3.341.300	3.640.500	3.932.900	5.164.364
Costa Rica	685.150	776.390	857.370	1.115.960	1.351.060	1.734.050	2.200.920	2.188.100	2.537.232	3.192.620	3.479.603
Republica Dominicana	1.757.300	2.249.400	2.290.730	2.456.800	2.985.190	3.052.500	2.961.800	2.992.000	2.968.900	3.194.800	3.481.200
El Salvador	-239.700	-106.818	-64.460	-128.890	-164.100	-141.100	-212.930	-90.152	-93.899	-77.081	139.457
Uruguai	153.279	135.045	325.488	371.802	408.751	703.440	753.400	1.024.772	1.157.234	1.547.792	1.059.430
Guatemala	79.330	-67.320	-243.900	-141.800	-259.500	-310.000	-276.100	64.119	-31.756	-149.713	14.779
Nicarágua	-129.900	-119.200	-123.200	-139.700	-156.100	-282.900	-223.800	-101.900	-144.000	-177.700	-202.500
Honduras	-189.961	-162.059	-204.194	-229.261	-290.742	-288.064	-327.725	-18.156	-193.301	-423.206	-446.015
Bolívia	-176.699	-187.378	-190.254	-193.700	-349.957	-400.271	-517.470	-499.810	-602.288	-859.780	-1.037.732
Equador	-715.938	-743.328	-953.620	-1.129.830	-1.304.740	-1.371.470	-1.571.400	-1.281.790	-1.525.934	-1.562.701	-1.406.481
Peru	-993.790	-899.950	-731.830	-834.270	-737.200	-1.191.980	-2.055.610	-1.175.997	-2.345.484	-2.132.478	-2.258.020
Chile	-701.470	-618.000	-745.870	-621.550	-631.400	-987.400	-963.900	-2.010.470	-1.879.900	-3.053.000	-2.276.303
Argentina	-1.460.220	-1.193.110	-1.330.990	-991.530	-500.610	-512.600	-1.284.100	-1.285.300	-1.159.960	-2.246.917	-3.365.822
Colômbia	-1.434.710	-1.439.120	-1.679.700	-2.102.260	-2.118.600	-2.606.940	-3.072.410	-2.882.564	-3.693.048	-4.736.696	-5.502.778
México	-4.738.500	-5.365.400	-5.657.900	-5.157.000	-6.287.700	-6.149.200	-6.950.300	-10.077.147	-10.396.762	-14.623.406	-14.342.067
Venezuela	-2.909.000	-2.634.000	-3.383.000	-3.997.000	-4.410.000	-7.960.000	-9.788.000	-9.949.000	-11.197.000	-13.697.000	-15.959.000
Brasil	-4.957.240	-4.931.100	-4.676.600	-8.308.600	-9.653.700	-13.218.600	-16.689.900	-19.245.400	-30.835.104	-37.951.972	-41.075.391
Haiti	-122.950	-164.950	-215.810	-403.400	-403.120	-429.820	-417.190	-393.230	-1.038.250	-891.000	-567.024
Paraguai	213.823	245.227	326.593	312.525	414.217	498.576	558.318	39.741	-84.427	-180.572	-170.237

Fonte: Trade Map, 2002-2012

La compétitivité des entreprises locales face aux multinationales dans les pays sous-développés d'Afrique : le rôle de la qualité des services

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Résumé

Depuis environ deux décennies, les marchés des pays sous-développés sont la cible des grandes firmes multinationales. Ces dernières ont des moyens financiers et techniques dont ne disposent pas les entreprises locales, qui sont pour la plupart des micros, petites ou moyennes entreprises. Aussi, les entreprises étrangères ont le bénéfice d'une image de marque et une réputation de qualité plus importantes, cela notamment en raison de la forte diffusion des TIC et l'accès aux chaînes de télévisions étrangères qui font la publicité de ces grandes marques. Il est également possible d'expliquer l'attrait des marques des entreprises multinationales comme étant une des conséquences de la colonisation des pays africains où le mythe du "blanc" est encore très vivace au sein des populations.

Dans un contexte aussi défavorable pour les entreprises locales, comment ces dernières peuvent-elles tirer leur épingle du jeu? Cette question mérite d'être posée car il est difficile aujourd'hui de citer des champions locaux dans la quasi-totalité des secteurs d'activité où ce sont très souvent les entreprises étrangères qui dominent le marché. Dans cet article, nous faisons l'hypothèse que les entreprises locales pourraient jouer sur les services (Vargo & Lusch, 2004), notamment leurs dimensions intangible, immatérielle et "culturelle" ou "locale" (Vargo & Lusch, 2008b), pour renverser la tendance en leur faveur.

Pour tester cette hypothèse, nous avons choisi d'étudier le positionnement stratégique des entreprises locales dans le marché fortement concurrentiel (d'Aveni, 1997) de la distribution des hydrocarbures au Sénégal. Ce marché est dominé par les "majors", des entreprises multinationales telles que Total et Shell. La présente étude sera de nature exploratoire par la méthode des cas (Yin, 2009). Ainsi, notre choix s'est porté sur deux acteurs locaux importants dans le marché des hydrocarbures au Sénégal. Il s'agit de Elton et EDK qui se caractérisent par leur positionnement essentiellement basé sur la création de valeur pour les clients en leur offrant une diversité de services. Nous démontrons dans cette recherche que les entreprises locales peuvent affronter les multinationales à travers la proposition d'une expérience-client différenciée et innovante. Elles peuvent réaliser une croissance durable en misant sur des services de qualité à travers certaines dimensions (Vargo & Lusch, 2008a) spécifiques pour se différencier des concurrents.

Mots-clés : Compétitivité-Services-Entreprises locales-Marketing-Positionnement stratégique

Introduction

La concurrence entre entreprises locales et FMN semble être devenue une thématique intéressante de recherche à partir de la fin des années 1990 et du début des années 2000 (Dawar et Frost, 1999 ; Gorynia et Wolniak, 2000 ; Lavie et Fiegenbaum, 2000 ; Li, 2002 ; Grosse, 2003 ; Zeng et Williamson, 2003).

En Afrique, la libéralisation économique qui a marqué les deux dernières décennies du 20^{ème} siècle a contribué à accentuer les défis auxquels devaient faire face les acteurs économiques locaux. Cette libéralisation s'est caractérisée par une arrivée massive des multinationales. L'arrivée des firmes multinationales sur un marché d'un pays émergents s'apparente le plus souvent à une sentence de mort contre les entreprises locales (Dawar et Frost, 1999). Zhang (2008) affirme d'ailleurs que les multinationales visent souvent à défenestrer purement et simplement les entreprises locales de leurs propres marchés domestiques.

Cette tendance pourrait se justifier par la saturation des marchés domestiques des multinationales et/ou de la forte croissance enregistrée dans les pays sous-développés. Elle pourrait également s'expliquer par l'émergence et le développement d'une classe moyenne dans les pays sous-développés, la participation des femmes à la vie active, et dans certains cas la possibilité d'accéder à des ressources stratégiques par l'implantation locale. Ces firmes multinationales ont des moyens financiers et techniques dont ne disposent pas les entreprises locales. Aussi, les entreprises étrangères ont le bénéfice d'une image de marque et une réputation de qualité plus importantes, cela notamment en raison de la forte diffusion des TIC et l'accès aux chaînes de télévisions étrangères qui font la publicité de ces grandes marques. Il est également possible d'expliquer l'attrait des marques des entreprises multinationales comme étant une des conséquences de la colonisation des pays africains où le mythe du "blanc" est encore très vivace au sein des populations.

Dans un contexte aussi défavorable pour les entreprises locales, comment ces dernières peuvent-elles tirer leur épingle du jeu ? Cette question mérite d'être posée car il est difficile aujourd'hui de citer des champions locaux dans la quasi-totalité des secteurs d'activité où ce sont très souvent les entreprises étrangères qui dominent le marché. Dans cet article, nous faisons l'hypothèse que les entreprises locales pourraient jouer sur les services (Vargo & Lusch, 2004), notamment leurs dimensions intangible, immatérielle et "culturelle" ou "locale" (Vargo & Lusch, 2008b), pour renverser la tendance en leur faveur.

Pour mener cette étude de nature exploratoire, au niveau des pays en développement, nous avons choisi une démarche qualitative. Nous nous sommes intéressés à un secteur en pleine mutation et fortement concurrentiel au Sénégal : celui de la distribution des hydrocarbures qui est un secteur soumis à une régulation stricte de la part des autorités publiques. Ce secteur dominé, pendant longtemps, par les FMN que l'on qualifie de majors dans le jargon spécialisé, voit l'arrivée d'acteurs nationaux que depuis récemment. C'est seulement en la faveur de la loi 98-31 du 14 avril 1998 libéralisant les secteurs du transport et de la distribution des hydrocarbures que l'on a vu émerger des acteurs locaux plus ou moins importants dans ce secteur. Malgré l'adversité et les difficultés, ces acteurs ont cependant su se faire une place au soleil. Ainsi, entre 2005 et 2012¹, les parts de marché cumulées de ces acteurs locaux (indépendants et réseaux de distribution intégré) sont passées de 12,47% à 37,58% pour le réseau terre et de 18,37% à 67,09% pour le réseau pêche. Avec une telle percée spectaculaire, les entreprises locales sénégalaises de distribution des hydrocarbures peuvent être citées en exemples de réussites locales. Ceci justifie l'étude de leur positionnement stratégique et de ses soubassements afin de voir en quoi ces expériences peuvent enrichir la littérature et le débat autour de la concurrence entre FMN et entreprises locales de façon particulière et de façon générale les relations de concurrence asymétriques. De même elle peut avoir une portée éminemment pratique en ce sens que des pistes de positionnement stratégique et de construction d'avantages concurrentiels peuvent être clairement dégagées.

Dans le cadre de cette recherche nous nous attardons d'abord sur le débat autour de la concurrence entre FMN et entreprises locales. Nous présentons par la suite l'approche de la Service Dominant Logic (SDL) qui nous sert de cadre d'analyse. Nous exposons ensuite la démarche méthodologique adoptée avant de présenter les principaux résultats de la recherche et enfin la conclusion.

1. La problématique de la concurrence entre FMN et entreprises locales

Il a été largement admis, et pendant longtemps, que les entreprises locales n'ont aucune chance de faire bonne figure dans un marché auquel s'attaquent des FMN (Dawar et Frost, 1999 ; Mathews, 2006). Au mieux, de l'avis même de certains dirigeants d'entreprises locales, trois options « stratégiques » de survie s'offraient à des entreprises locales dont les marchés domestiques sont attaqués par des FMN (Dawar et Frost, 1999). Il s'agit :

- D'un retrait pur et simple de l'entreprise locale du marché ;

¹ Numéro spécial Magazine Réussir Mai-Juin 2014

- D'un interventionnisme étatique pour freiner les FMN ;
- D'une capitulation déguisée pour être absorbée par les FMN et devenir ainsi un « vassal » pour elles.

Selon cette thèse, il serait inutile, voire suicidaire, pour une entreprise locale de vouloir user de stratégies offensives à même de lui permettre de prospérer face à la concurrence des multinationales étrangères.

Cependant, à partir de la fin du siècle dernier, quelques chercheurs (Dawar et Frost, 1999 ; Gorynia et Wolniak, 2000, 2005 ; Lavie et Fiegenbaum, 2000 ; Li, 2002 ; Grosse, 2003 ; Zeng et Williamson, 2003 ; Jaffe et al., 2005 ; Xie et White, 2005, 2010 ; Khanna et Palepu, 2006 ; Mathews, 2006 ; Wu et Pangarkar, 2006 ; Arindam et al., 2008 ; Chang et Xu, 2008 ; Poulis et al., 2011 ; Ramamurti 2012 ; Barki et al., 2012 ; Azmeh et Nadvi, 2014) se sont mis à s'intéresser à la problématique de la concurrence entre FMN et entreprises locales en termes de stratégies pouvant conduire au triomphe des entreprises locales. L'une des particularités de ces recherches est qu'elles se focalisent généralement sur la confrontation entre FMN et entreprises locales dans des pays dits émergents. La question essentielle que posent les chercheurs est alors de savoir s'il existe une ou des stratégie(s) qui pourraient permettre aux entreprises locales de ces pays émergents de construire un ou des avantage(s) concurrentiel(s) qui pourraient les conduire à des performances solides et soutenues.

Dans de nombreux pays dits émergents, on a assisté, à bien des égards, à une opposition farouche entre des firmes multinationales et des entreprises locales. En effet, alors que les multinationales profitaient de l'ouverture progressive des marchés pour exporter ou s'implanter dans ces pays (Dawar et Frost, 1999 ; Lavie et Fiegenbaum, 2000), certaines entités locales ont pu se développer de façon spectaculaire à tel point qu'on est arrivé à parler de multinationales émergentes pour certaines d'entre elles (Mathews 2006 ; Xie et White, 2005, 2010). Pour essayer de contrer la puissance financière, l'expérience, le savoir faire et la notoriété des multinationales ; ces entreprises locales ont mis en œuvres diverses stratégies grâce à divers avantages concurrentiels dont elles ont pu se doter.

Tout d'abord, les entreprises locales sont supposées avoir une plus grande facilitée à construire une meilleure adaptabilité de leurs réseaux de distribution et à en assurer une meilleure couverture (Dawar et Frost, 1999 ; Lavie et Fiegenbaum, 2000 ; Li, 2002 ; Grosse, 2003 ; Jaffe et al., 2005 ; Xi et White 2005 ; Barki et al., 2012). De même, elles sont réputées avoir une meilleure maîtrise des aspects culturels locaux qui peuvent conférer une plus grande

valeur, une plus grande visibilité et une plus grande notoriété dans l'esprit des consommateurs à travers une « *connaissance intime* » de ceux-ci (Arindam et al., 2008). L'avantage dont disposent les entreprises locales peut aussi se traduire par des campagnes de communication mettant en avant des vedettes de la scène culturelle locale à travers ce que Barki et al., (2012) qualifie de « *proximité émotionnelle* » (Dawar et Frost, 1999 ; Xie et White, 2005 ; Xie et White, 2010 ; Barki et al., 2012). Dans ce cas, on peut donc considérer que les entreprises locales peuvent considérer les spécificités socioculturelles comme des facteurs clés de succès en leur faveur. La meilleure maîtrise de ces spécificités constituerait ainsi un avantage concurrentiel notamment par rapport la distribution des produits et de la communication autour de ceux-ci.

En outre, des croyances locales particulières sont susceptibles d'influencer la perception des consommateurs. De telles croyances peuvent notamment être relatives au bien-être physique (considérations sanitaires et hygiéniques) et/ou psychique (considérations spirituelles et religieuses) que procurent les produits et/ou services des entreprises locales (Lavie et Fiegenbaum, 2000 ; Xie et White, 2005, 2010 ; Wu et Pangarkar, 2006 ; Zhang, 2008). Ces perceptions peuvent alors devenir des déterminants sur lesquels les entreprises pourraient jouer pour renforcer l'apriori d'une meilleure qualité de leurs produits et services. De même, les entreprises locales peuvent disposer d'une meilleure maîtrise des réalités sociales et/ou climatiques locales qui sont souvent inédites pour les multinationales. Ceci peut notamment permettre à ces entreprises d'offrir des produits et services présentant une meilleure adéquation par rapport à de telles réalités (Lavie et Fiegenbaum, 2000 ; Ramamurti, 2012). Dans cette perspective, les éléments des croyances locales, des goûts locaux et des conditions socio-écologiques locales deviennent donc pour les entreprises locales des facteurs clés de succès. Elles pourraient ainsi en tirer un avantage concurrentiel en termes de qualité perçue par les consommateurs des offres de ces entreprises.

Les éléments de stratégies identifiées ci-dessus permettent d'avoir la certitude qu'il est possible pour des entreprises locales de lutter et d'être performantes face à des multinationales qui s'attaquent à leurs marchés domestiques. Cela est d'autant plus sûr que des entreprises des pays émergents ont pu le faire au point de se transformer en multinationales pour certaines d'entre elles (Mathews, 2006). Ainsi, la question pertinente que l'on doit se poser n'est plus de savoir s'il est possible pour des entreprises locales des pays en développement de pouvoir faire la même la chose. Il serait plutôt plus judicieux de se demander comment ces entreprises

locales des pays en développement pourraient parvenir à faire la même que certaines de leurs semblables des pays émergents.

S'il y a une constante que l'on peut dégager concernant les leviers stratégiques, ci-dessus, identifiées par différents auteurs comme pouvant être à la base des succès des entreprises locales des pays émergents face aux FMN ; c'est la valorisation de leur offre par la clientèle. En effet, il transparaît que les entreprises locales s'appuient moins sur la qualité intrinsèque de leurs produits que sur la façon dont les consommateurs locaux les valorisent dans leurs esprits. Cette valorisation tient pour beaucoup aux services que les clients se voient offrir et notamment à certaines dimensions intangibles de ces services. Il est, dès lors, permis de penser que la concurrence se fait sur la base d'une logique dominante du service rendu au consommateur ou perçu comme tel par lui. Cela fonde l'intérêt de mobiliser le paradigme de la Service-Dominant Logic comme cadre d'analyse dans cette recherche.

2. Le paradigme de la Service-Dominant Logic

Pendant longtemps et de façon traditionnelle, la littérature en marketing a mis en avant le produit et certaines de ses attributs comme les principales sources d'avantages concurrentiels (Vargo et Lusch, 2004a ; Lusch et al., 2007 ; Vargo et Lusch, 2007 ; Besson et Moreno, 2009 ; Vargo et Lusch 2008a ; Vargo et Lusch, 2008c ; Vargo et Akaka, 2009). À titre d'illustration, l'une des visions les plus célèbres développée en marketing, celle des « 4P », tourne fondamentalement autour du produit à bien des égards et de l'échange dont il peut faire l'objet. En effet, même si les différentes composantes sont assez distinctes, de façon plus ou moins évidente, on peut renvoyer chacune des trois autres à celle du produit :

- Le produit doit être au bon prix ;
- Le produit doit être à la bonne place ;
- Le produit doit avoir la bonne presse.

Ce n'est d'ailleurs pas étonnant si l'une des premières définitions que l'on a donné au marketing, celle de l'American Marketing Association (AMA) dans les années 1930 ; est qu'il est « *un ensemble de mesures prises afin de permettre au producteur d'écouler ses produits et services auprès du consommateur*² » (Kotler et al., 2004). Cette vision et cette définition s'inscrivent dans ce que l'on a qualifié de paradigme de la « Goods-Dominant » Logic (GDL) (Vargo et Lusch, 2004a ; Lusch et al., 2007 ; Ballantyne et Varey, 2008 ; Vargo et al., 2008 ;

² Traduction libre

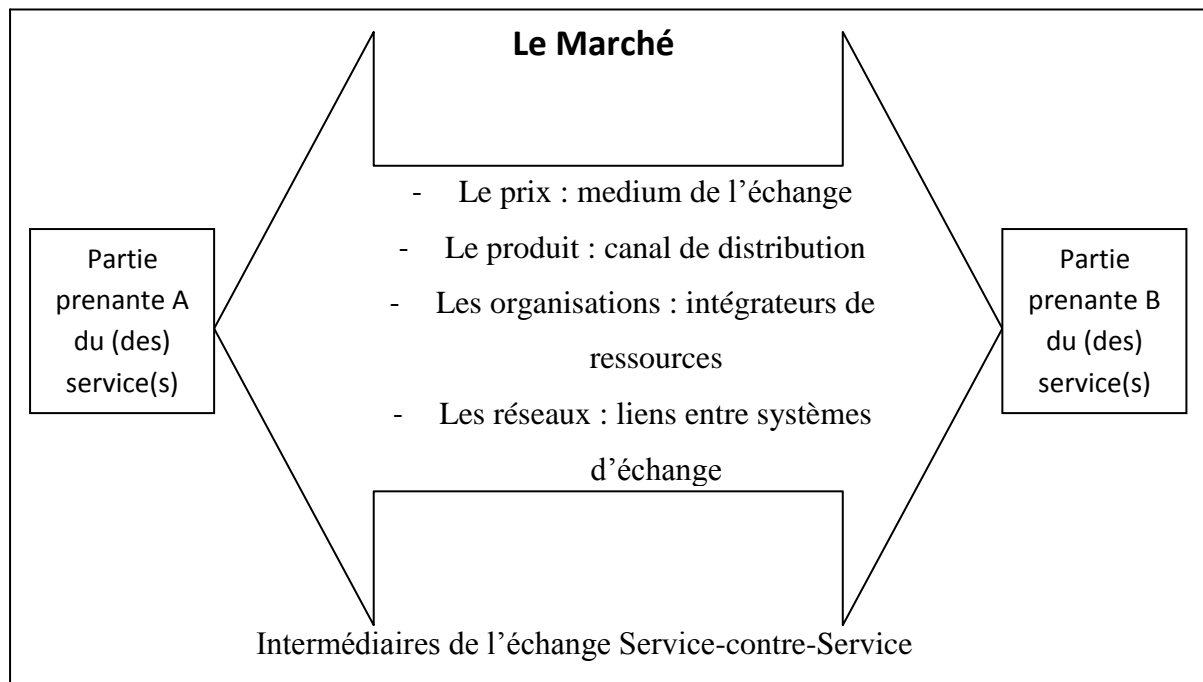
Vargo et Lusch, 2008a ; Vargo et Lusch, 2008b ; Vargo et Lusch, 2008c ; Vargo, 2008 ; Vargo et Akaka, 2009). Cette logique consiste à considérer que l'entreprise crée de la valeur qu'elle met à la disposition du consommateur au travers de son produit. En échange, le consommateur paie l'équivalent de ce produit en argent (Vargo et Lusch, 2004a ; Vargo et al., 2008 ; Vargo et Akaka, 2009). Le client serait donc intéressé, non par la valeur du produit qu'il achète, mais par le produit en tant que tel. Cette conception relève notamment de la théorie économique néoclassique qui sous-tend la vision traditionnelle du marketing (Vargo et Lusch, 2004a ; Vargo et Morgan, 2005 ; Moreno et Besson, 2009 ; Vargo et Akaka, 2009).

À partir des années 1990, plusieurs voix se sont mises à remettre en cause l'évidence de la pertinence des théories marketing s'inscrivant dans la vision classique dont l'origine remonte aux années 1950 (Moreno et Besson, 2009). L'une des remises en causes parmi les plus tranchantes de cette vision traditionnelle du marketing est celle défendue par Gummesson (1993) qui « *mettait déjà en évidence que les clients n'achètent pas des biens ou des services, mais qu'ils achètent des offres qui créent de la valeur* » (Moreno et Besson, 2009). En fait, les évolutions multiples et souvent radicales et spectaculaires apparues dans l'environnement économique ces dernières années rendraient caduques beaucoup de présupposés sur lesquels se fonde cette vision classique du marketing (Vargo et Lusch, 2004b ; Moreno et Besson, 2009 ; Lusch et al., 2007 ; Vargo et al., 2008 ; Béji-Bécheur, 2010). C'est ainsi que Vargo et Lusch (2004a) vont proposer une (r)évolution « *paradigmatique* » majeure afin de prendre en considération l'ensemble des paramètres induits par ce nouveau contexte. Il s'agira de passer de la « Goods-Dominant » Logic (GDL) à la « Service-Dominant » Logic (SDL). Il faut néanmoins garder à l'esprit que si la « Goods-Dominant » Logic peut être considérée comme un paradigme à part entière (Vargo et Lusch, 2008a ; Vargo et Lusch, 2008b ; Vargo et Lusch, 2008c ; Vargo et Akaka, 2009 ; Béji-Bécheur, 2010), la « Service-Dominant » Logic ne le serait pas encore totalement (Vargo et Lusch, 2008c ; Vargo, 2008).

Dans cette nouvelle approche la notion de service, au sens de rendre service (Béji-Bécheur, 2010), devient une (la) notion centrale (Vargo et Lusch, 2004a ; Vargo et Lusch, 2004b ; Béji-Bécheur, 2010). Ici, le service, au singulier, pourrait être considéré comme « *un processus de faire quelque chose pour quelqu'un* » (Vargo et Lusch, 2008a). Mieux encore, on peut le définir d'une façon englobante (Béji-Bécheur, 2010) comme étant « *l'application de compétences spécialisées (connaissances et savoir-faire), au travers des actions, processus, et performances pour le bénéfice d'une autre entité ou pour l'entité elle-même* » (Vargo et Lusch, 2008c). Cette définition du service centrée autour des connaissances et du savoir-faire

permet de considérer que le service est l'élément clé qui permettrait, sinon la construction, assurément l'exploitation d'avantages concurrentiels par une entreprise (Vargo et Lusch, 2004a ; Lusch et al., 2007 ; Vargo et Lusch, 2008b ; Vargo et al., 2008).

La SDL « propose de ré examiner la vision dominante centrée autour des échanges de produits pour lui substituer une logique centrée autour des échanges de service » (Moreno et Besson, 2009). Elle propose d'aller au-delà des simplifications qui justifient l'orientation produit et même celles qui justifient l'orientation marché (consommateur) pour considérer une orientation dite « Service » (Lusch et al., 2007). Il faudra donc parler, dès lors, des réseaux ou coalitions d'acteurs qui interagissent pour délivrer des services les uns aux autres dans des relations complexes (Lusch et al., 2007 ; Vargo et Lusch, 2008a ; Vargo et Lusch, 2008c ; Ballantyne et Varey, 2008 ; Vargo et Akaka, 2009). Ainsi apparait, en marketing, la notion de parties prenantes qui s'échangent des services dans le but de se satisfaire mutuellement. Le produit ne devient, dès lors, qu'une manière, un intermédiaire parmi tant d'autres qui permet de délivrer de la valeur : le service mutuellement rendu aux uns et aux autres (Vargo et Lusch, 2004a ; Vargo et al., 2007 ; Vargo et Lusch, 2008b ; Vargo et Lusch, 2008b ; Vargo et al., 2008 ; Moreno et Besson, 2009). Les autres intermédiaires les plus évoqués sont le prix, les organisations et les réseaux (Vargo et Akaka, 2009 ; Moreno et Besson, 2009).



Ainsi, la conception selon laquelle le service est la base des échanges constitue la première proposition parmi les dix auxquels vont aboutir les travaux sur la SDL (Vargo et Lusch, 2004a ; Lusch et al., 2007 ; Vargo et Lusch, 2008b ; Vargo et Akaka, 2009). L'ensemble de ces propositions ainsi que leurs justifications sont reprises dans le tableau ci-dessus.

	Proposition	Justification
FP1	Le service est la base des échanges	Le service est échangé contre un autre service
FP2	Les échanges indirects masquent la base réelle d'échange.	Les produits, la monnaie et les institutions masquent l'échange de base qu'est le service pour un service.
FP3	Les biens sont des vecteurs de distribution du service.	La valeur des biens (durables ou consommables) est définie par leur usage, par le service qu'ils fournissent.
FP4	Les compétences spécialisées et connaissances constituent la principale source d'avantage compétitif.	La capacité comparée à provoquer les évolutions souhaitées guide le jeu concurrentiel.
FP5	Toutes les économies sont des économies de service.	Le service devient plus apparent aujourd'hui du fait de la spécialisation accrue et de l'externalisation.
FP6	Le client est toujours co-créateur de valeur.	La création de valeur se fait dans l'interaction.
FP7	L'entreprise ne peut pas délivrer de valeur ; elle ne peut que faire des propositions de valeur.	L'entreprise peut proposer ses ressources pour la création (interactive) de valeur mais ne peut pas la créer / délivrer seule.
FP8	Une logique centrée sur le service est naturellement orientée client et relation.	Le service est déterminé et co-créé par le client ; de ce fait il est naturellement orienté client et relationnel
FP9	Tous les acteurs économiques et sociaux sont des intégrateurs de ressources.	Le cadre de la création de valeur c'est le réseau des réseaux, l'intégration de ressources complémentaires.
FP10	La valeur est toujours déterminée de façon unique et phénoménologique par le bénéficiaire.	La valeur est idiosyncratique, contextuelle et chargée de sens.

Source : Moreno et Besson (2009), adapté et traduit de Vargo et Lusch (2008b).

Ces évolutions dans les approches théoriques en termes de logiques vont induire une évolution par rapport aux différents concepts et discours grâce auxquels on explique la nature des relations qui existent entre les parties prenantes (Vargo et al., 2008 ; Vargo et Akaka, 2009 ; Béji-Bécheur, 2010).

Tableau traduit de Lusch et Vargo, (2006 : 286)

Concepts GDL	Concepts de transition	Concepts SDL
Biens	Services	Service
Produits	Offres	Expériences
Attributs	Bénéfices	Solution
Valeur ajoutée	Co-production	Co-crédation de valeur
Maximisation du profit	Ingénierie financière	Apprentissage financier

Prix	Valeur offerte	Valeur proposée
Système d'équilibre	Systèmes dynamiques	Systèmes complexes adaptatifs
Chaîne d'offre	Chaîne de valeur	Réseau de création de valeur
Promotion	Communication intégrée	Dialogue
Vers le marché (lancer sur)	Marché vers (cibler)	Commercer (market with)
Orientation produit	Orientation marché	Orientation service

Source : Béji-Bécheur (2010)

L'une des évolutions conceptuelles les plus remarquables de la SDL est celle qui a consisté à marquer le passage de la focalisation sur le concept de la valeur ajoutée à ce lui de la co-crédation de la valeur. Désormais la concurrence, qui se fera au travers du service (Lusch et al., 2007), nécessitera l'implication effective et affective des consommateurs dans la co-crédation de ce service (Lusch et al., 2007 ; Vargo et al., 2008 ; Vargo et Lusch, 2008b).

Ainsi nous avons choisi de nous focaliser sur trois propositions parmi celles proposées dans l'approche SDL.

Au Sénégal, le secteur des hydrocarbures étant étroitement régulé et réglementé, avec notamment des tarifs uniques fixés par l'autorité publique, on peut supposer que le positionnement stratégique des entreprises du secteur se fait essentiellement sur la base du service rendu aux clients.

P1 : Le service, base des échanges, et la qualité du service sont la base essentielle des positionnements stratégiques des entreprises de distribution d'hydrocarbure au Sénégal (FP1).

Par ailleurs, les multinationales disposant des moyens nettement plus importants et d'une image de marque qui est plutôt en leur faveur, les entreprises sénégalaises de distribution d'hydrocarbure peuvent et doivent s'appuyer sur les connaissances et la maîtrise des spécificités socioculturelles locales pour réussir face aux majors du secteur.

P2 : Les compétences spécialisées et connaissances constituent la principale source d'avantage compétitif (FP4).

Les entreprises sénégalaises de distribution d'hydrocarbure peuvent optimiser leurs avantages concurrentiels au détriment des multinationales en impliquant davantage le client dans le processus de création de valeur et en faisant de lui un co-acteur à part entière de leurs activités.

P3 : Le client est toujours co-crédateur de valeur.

3. Méthodologie

L'objectif poursuivi dans cette étude est d'explorer les réponses stratégiques des entreprises locales sénégalaises du secteur de la distribution des hydrocarbures confrontées à la concurrence des « majors ». Nous avons opté pour une démarche d'études de cas (Yin, 2003) et avons choisi d'étudier de manière exploratoire les réponses stratégiques mises en œuvre par Elton et EDK.

Comme cela a été déjà précisé, le marché des hydrocarbures au Sénégal a pendant longtemps été dominé par les « majors » Total et Shell. À ces deux grands acteurs est venu s'ajouter le libyen Oilybia qui a racheté le réseau de Mobil. Cette configuration va changer avec le vote de la loi 98-31 du 14 avril 1998 libéralisant le marché. C'est en l'an 2000, dans la foulée de la première alternance politique à la tête de l'état, qu'une entreprise sénégalaise, ELTON, va s'engager dans ce secteur dont les barrières à l'entrée sont très élevées du fait de l'importance des capitaux nécessaires mais surtout les difficultés d'accès au pétrole lorsque le pays n'en produit pas malgré l'existence de la Société africaine de Raffinage chargée d'approvisionner les distributeurs.

C'est à ce double défi qu'une poignée de sénégalais s'est attaquée pour bâtir ce qu'ils vont fièrement nommer "la première entreprise hydrocarbure 100% sénégalaise", le Groupe ELTON. Pour se faire une place, l'entreprise se devait d'offrir une gamme de produits et de services pouvant apporter une valeur supplémentaire aux clients. C'est ainsi que le concept Oasis fut présenté comme une offre différente, un cadre où automobilistes et autres personnes voulant trouver un endroit où se désaltérer et se restaurer peuvent se retrouver. Ainsi, l'entreprise se positionne comme une alternative aux géants du secteur.

L'orientation stratégique revendiquée par l'entreprise est fondée sur "l'expertise et la capacité d'adaptation de nos hommes, la qualité du service au client, la mise en œuvre d'une politique rigoureuse de sécurité et de protection de l'environnement, valorisant (l') image d'entreprise citoyenne, responsable et professionnelle" selon les dires de Manar Sall, le nouveau DG de la holding ELTON International. Pour la réussite de sa stratégie, l'entreprise déploie une multitude d'activités regroupées autour des grands axes suivant:

- Distributeur de produits et services pétroliers à travers un réseau de station-service et pompe pêche
- Offre de services diversifiés dans le réseau de Boutique Eden's et d'Espace Auto et d'Espace d'E-Services

- Fournisseurs de produits et services liés aux carburants et lubrifiants aux industriels des PME et PMI mais aussi aux grandes entreprises du secteur minier

- Représentant exclusif de la marque de Lubrifiants Castrol au Sénégal et dans la sous région
- Exporte des produits pétroliers dans la sous région (Mali , Guinée, Guinée Bissau)

Fondé en 2009 par un ancien émigré sénégalais aux Etats Unis et au Japon, EDK (Etablissements Demba Kâ, du nom fondateur de l'entreprise), se veut être « un ensemble de stations multiservices d'essence, gasoil, mais aussi d'entretien tous véhicules, de supérettes, de restaurants, de fast-food, de boulangeries, de pâtisseries et de banques crédit-agricoles ». L'entreprise exploite aujourd'hui un réseau de onze (11) stations multiservices dans plusieurs parties du pays. La majorité d'entre elles sont situées à l'entrée (la sortie) des grandes agglomérations sur la route nationale. Ce positionnement est assimilable à celui des aires de repos au niveau des grandes autoroutes dans les pays occidentaux. L'investissement moyen pour bâtir une station est estimé autour de 500 millions de francs CFA.

Le fondateur est présenté comme un autodidacte qui a profité de ses voyages pour imaginer le concept EDK. Sa démarche n'a pas été planifiée. Dans la foulée de la loi libéralisant la distribution des produits d'hydrocarbures, M. Kâ a créé sa petite station dans une zone résidentielle en devenir. Il a rencontré au départ des vagues de protestation du voisinage qui n'a pas toujours apprécié cette implantation malgré la participation de l'entreprise à des projets d'utilité publique notamment l'assainissement de la zone. Sa stratégie s'affirme véritablement avec l'ouverture de la première station multi-services à Bargny à la sortie de Dakar (à environ 30 Kms). L'adhésion populaire des usagers de la route mais également des populations locales qui trouvent en l'endroit un lieu de vie vont convaincre le promoteur de poursuivre sur cette voie. Des ouvertures emblématiques vont suivre dans des villes symboliques : grands centres religieux (Touba et Tivaoune), carrefours internationaux (Saint-Louis, Kaolack), etc.

L'entreprise, pour assurer son développement, est aujourd'hui portée vers le recrutement de professionnels dans les domaines techniques, administratives, financières et commerciales. Les stations sont en gérance directe depuis le siège à Dakar. Les gérants sur place sont des managers-salariés. Ce choix engendre d'importants coûts de gestion et de coordination à cause notamment des longues distances pouvant séparer le siège et quelques unes des stations. Saint-Louis est 270 Kms tandis que Kaolack est à 200 Kms.

Nous avons effectué au moins 30 entretiens formels. Les personnes interrogées ont la plupart du temps objecté le fait de ne pas avoir l'autorisation formelle de leur hiérarchie. Nous n'avons donc pas pu enregistrer les entretiens sauf pour le Gérant de la station EDK de Saint-Louis. Nous avons également pu récupérer deux entretiens du Directeur Générale d'ELTON paru dans la presse écrite (Magazine Réussir, mai-juin 2014) et une vidéo (diffusée par la chaîne panafricaine Africa 24). Ces données ont été complétées par d'autres de sources secondaires (presse nationale et internationale), sites institutionnels des entreprises, rapport sur le secteur au Sénégal. L'ensemble des données exploitées avoisine 300 pages.

Toutes nos données ont fait l'objet d'analyse de contenu après retranscription des entretiens audio (Miles & Huberman, 1994 ; Blanchet & Gotman, 2001 ; Mucchielli, 1998). Nous avons poursuivi une logique inductive en eux deux phases : une première phase de catégorisation afin d'identifier les grands axes thématiques pouvant nous permettre d'apprécier les réponses stratégiques des deux cas étudiés. Dans la deuxième phase de notre analyse, nous avons cherché comment les différents thèmes revenaient dans les données collectées.

4. Résultats

Notre étude a révélé que les facteurs sur lesquels jouent les deux entreprises étudiées (Elton et EDK) pour être compétitifs dans le secteur de la distribution des produits hydrocarbures au Sénégal sont :

- Le professionnalisme
- L'innovation et l'accroissement de la valeur pour les clients : une station devient un « lieu de vie »
- La connaissance client et la proximité socio culturelle
- La personnalisation de la relation client
- Avoir une responsabilité sociétale

L'importance d'avoir une image professionnelle

Le carburant est un produit sensible. Pour avoir la même reconnaissance, sinon plus, que les entreprises multinationales, les entreprises locales doivent manifester une attitude professionnelle à tout point de vue. D'abord au niveau des produits. Ils doivent ainsi s'approvisionner chez le même fournisseur que les majors. Au Sénégal, le fournisseur

reconnu par les autorités étatiques est la Société Africaine de Raffinage (la SAR). Au-delà du choix du fournisseur, les entreprises étudiées veillent à réduire le risque de comportement opportuniste des transporteurs qui sont des indépendants à l'égard aussi bien des distributeurs que de la SAR. Ainsi, comme le rapporte le gérant de la station EDK de saint-Louis :

« Quand le camion arrive au niveau de la station, y a une température et une densité qu'on écrit sur leur feuille de route. C'est au niveau de sa sortie au niveau du dépôt. Cette température là et cette densité là doivent être les mêmes à l'arrivée à la station, à quelques degrés variables, en fait avec une marge d'erreur. Arrivée au niveau de la station on a un thermo-densimètre pour vérifier cette température et cette densité, pour vérifier la qualité du produit. »

Elles veillent ainsi à offrir aux clients qui viennent s'approvisionner dans leurs stations la meilleure qualité de carburant possible sur le marché. Des tests journaliers sont également effectués pour éviter que l'eau soit en quantité anormale dans les cuves.

Pour en arriver à ce résultat, les entreprises étudiées disent recruter des personnes qualifiées, la plupart ayant déjà une expérience dans les entreprises multinationales comme Total et Shell. Les employés sont également sensibilisés à propos de l'importance du client. Un client nous conta :

« un jour, un agent d'ELTON m'a accueilli d'une manière inhabituelle. J'étais venu nettoyer la carrosserie de ma voiture et il m'a suggéré de rajouter d'autres services que je n'avais pas prévu sous prétexte que le lavage carrosserie (seulement) est fatigant et mal payé par le client... A mon retour, pour récupérer le véhicule, je me suis rendu compte que le service était mal fait. Lorsque j'ai voulu en parler au gérant, l'employé m'a supplier de ne rien dire car il risquait ainsi son travail. Et que s'il s'était comportait ainsi, c'est par ce qu'il était dans un mauvais jour, à cause de son épouse malade... »

Ces propos confirment ceux du directeur général d'Elton disant :

« nos stations sont en gérance directe, cela veut dire que les employés qui sont dans nos stations sont nos employés..... si un client n'est pas satisfait de la façon dont il a été traité..., s'il se plaint, on peut faire partir de suite l'employé qui n'a pas fait correctement son travail ».

Les mêmes règles sont respectées pour les autres activités notamment la restauration et dans les boutiques pour la distribution de produits divers. Les responsables de ces entreprises considèrent ainsi qu'ils accompagnent la professionnalisation de ces secteurs où pendant longtemps ont régné l'amateurisme, l'informel, le non respect des règles d'hygiène et de

salubrité. Toutes choses qu'ils veillent à corriger avec leurs stations multi-services qui deviennent de véritables lieux de vie dans des contextes où les offres existantes ne sont pas toujours satisfaisantes.

L'innovation et l'accroissement de la valeur pour les clients : une station devient un « lieu de vie »

La propension à innover, à apporter de nouvelles solutions, adaptées aux besoins réels des populations est un élément essentiel dans la concurrence entre les entreprises locales et les firmes multinationales dans les secteurs matures comme la distribution de produits hydrocarbures. Les entreprises sénégalaises étudiées dans ce secteur en font une condition pour être compétitive. C'est dans cet esprit qu'il faut inscrire la création de stations multi-services. Selon les responsables de ces entreprises, l'importance des investissements à consentir ne doit pas constituer un frein à l'innovation.

« C'est une innovation. Il faut que les gens sachent oser et innover... si vous voyez, les stations dans les régions, on les construit à l'extérieur des habitations... et les gens viennent. » (Gérant EDK SL)

« Il y a aussi que nous avons une grande réactivité au moindre mouvement dans notre marché de même qu'une forte capacité d'anticipation. Un brin de créativité qui nous permet d'explorer de nouveaux concepts. » (DG Elton)

Les stations de distribution de produits hydrocarbures ne sont plus seulement des lieux où se rendent des automobilistes qui veulent se réapprovisionner en carburant. C'est devenu « *des destinations où les clients peuvent bénéficier de plusieurs services.* » Les clients vont dans ces endroits pour se restaurer, faire leurs courses, effectuer une opération bancaire, ou encore se reposer lorsqu'on fait un long trajet avec la possibilité de se doucher, faire ses prières (dans un pays à plus de 95% de musulmans). Le gérant de la station EDK de Saint Louis a insisté sur la propreté des toilettes.

« tous les jours, de 7h00 du matin jusqu'à 00h, des techniciens de surface s'occupent uniquement de nettoyer les toilettes de la station. ... ici cinq personnes s'occupent du nettoyage des toilettes... »

Il compare cette pratique avec ce qu'il a connu chez un concurrent multinational où il a travaillé plus d'une dizaine d'années et où ce sont les pompistes qui à leurs heures perdues s'occupent du nettoyage des toilettes.

En offrant au client dans leurs stations, une plateforme de services, les entreprises Elton et EDK cherchent ainsi à se différencier et se donner une image plus proche des préoccupations de la clientèle.

La connaissance client et la proximité socio culturelle

En déclarant « *L'Afrique est notre continent, ..., le client africain, nous le connaissons mieux que quiconque...* », le DG d'Elton souligne ainsi l'importance de la connaissance client pour être compétitif aujourd'hui sur ce marché. Ainsi le profil socio-culturel des clients est considéré par les entreprises afin de leur apporter une attention la plus adaptée possible. Par exemple, les employés d'EDK Saint-Louis sont sensibilisés sur le fait que la ville est une porte d'entrée dans le pays pour les émigrés et pour les étrangers notamment les mauritaniens qui viennent par la route. Ceux qui passent pour la première fois sont guidés par les agents de sécurité qui leur présentent l'ensemble des services dont ils peuvent bénéficier dans cet espace. Leur argumentaire est ainsi présenté :

« il y a des toilettes derrière, vous pouvez vous lavez. Il y a aussi un restaurant, une mosquée. Vous pouvez bien vous reposer avant de repartir. Si vous avez besoin de services bancaires également, ... ».

Au-delà de l'offre commerciale, c'est aussi une manière pour ces entreprises d'apprendre à mieux connaître les clients. La création de toilettes chez EDK serait ainsi la conséquence des sentiments exprimés par les clients dénonçant l'insalubrité et le caractère exigüé des toilettes dans les stations services.

Selon le lieu d'implantation et le profil des clients à servir sur place, le profil du personnel peut varier. Du fait de la proximité avec l'Université Gaston Berger de Saint-Louis, EDK veillent à y affecter des salariés manifestant des habilités à bien communiquer aussi bien en français qu'en langues nationales avec les clients. Des marges de manœuvre sont également laissées au gérant sur place pour élaborer des facilités de paiement aux composantes de l'université du fait des procédures complexes et le plus souvent l'absence de liquidités.

« pour certains gros clients, on leur fait des réductions de différente nature. Ce sont des avantages qu'on fait pour certains gros clients. Pour les autres, les clients crédibles, on leur fait des avances, on leur fait des prêts, des crédits. Par exemple, pour l'université c'est un gros marché pour Saint-Louis. L'université ne paie pas à

temps. Pour chaque UFR ou bien le rectorat ou bien le CROUS, on leur fait des avances. Par exemple quelqu'un qui fait un engagement de 2000 litres, on lui fait une avance de 500 à 1'000 litres. Le temps que l'engagement soit traité par l'agence comptable. Alors que les autres compagnies ne le font pas. »

Il y a ainsi une certaine forme de personnalisation de la relation client pour créer une plus grande proximité avec la clientèle.

La personnalisation de la relation client

Les entreprises Elton et EDK insistent sur la nécessité de fidéliser la clientèle. Pour ces entreprises, la satisfaction du client est essentielle pour le maintenir mais au-delà, il faut jouer sur les relations personnelles. Ainsi les employés sont encouragés à renforcer leur proximité avec la clientèle. Le gérant de la station EDK de Saint-Louis atteste ainsi à propos des clients :

« ils viennent, ils garent leurs véhicules, des fois ils laissent leurs véhicules avec les graisseurs et ils rentrent chez eux, ils vont travailler, ... Et puis avec la conscience tranquille que leurs véhicules ne seront pas endommagés, rien ne sera volé ... Ils sont tranquilles. Des fois moi, quand je ne suis même pas là, y a des clients qui viennent ... Et puis bon moi, personnellement, j'ai cultivé ça : ma relation personnelle avec le client. En fait, pour moi c'est très important : avoir une relation particulière avec le client. Partout où je les vois, je vais les saluer, passer une à deux minutes, discuter, voir si tout va bien. Bon se soucier de leurs véhicules, se soucier de leur santé, ... Bon, c'est des petits gestes qui pèsent. Parce que un client il veut toujours être bien traité. Savoir prendre en charge le client, ça c'est extraordinaire ! »

Cette volonté de gestion personnalisée des clients peut même déterminer les choix en matière d'investissement ou d'orientation stratégique. Ayant opté pour une implantation à la sortie /entrée des grands centres urbains afin de se doter de grands espaces pour implanter ses stations, EDK a, entre autres raisons, considéré le fait que certains clients peuvent disposer de bons de carburant. En déplacement, ils peuvent avoir besoin de se réapprovisionner. C'est ainsi que la stratégie du groupe a été légèrement modifiée pour une plus grande satisfaction de la clientèle, en ouvrant une station en zone urbaine dans la région dakaroise.

Avoir une responsabilité sociétale

Les entreprises locales se différencient de leurs concurrentes multinationales en manifestant un engagement plus ferme dans la gestion des préoccupations des populations locales. Elles participent ainsi à la gestion de problèmes dus à des causes naturelles comme les inondations très fréquentes. EDK a ainsi participé à la canalisation de la zone où est implantée la première station du groupe (dans le quartier des Maristes). Cela a permis d'atténuer les frustrations de certaines parties prenantes qui ne souhaitaient pas leur implantation sur le site.

Dans le même ordre d'idées, l'entreprise (EDK) se fait l'obligation de recruter un personnel local pour combattre le chômage de masse et lutter contre la pauvreté endémique dans les zones où elle s'implante.

« à Saint-Louis, 80% du personnel habite Sanar et Bango et Saint-Louis. D'ailleurs on a 40 personnes qui travaillent ici à Saint-Louis. quand on s'implante à Saint-Louis, il faut que les gens de Saint-Louis bénéficient de cette station là. Même par rapport aux partenariats, à l'UGB : toute manifestation qui se passe à l'université, si les gens nous sollicitent on fait notre participation. il faut participer au développement local. Par exemple dans cette mosquée là, c'est nous qui avons acheté les radios et tout. Donc c'est comme ça qu'il ... La mosquée de Sanar.

Ainsi les facteurs clés de succès à maîtriser pour faire face à la concurrence des entreprises multinationales dans le secteur de la distribution des produits hydrocarbures sont : avoir une image professionnelle, une offre de services diversifiés, une bonne connaissance client et une proximité culturelle, une relation personnalisée avec le client et enfin être socialement utile dans la communauté où sont implantées les stations. Tout cela passe par une propension à innover au-delà des activités classiques du secteur pour offrir aux clients des solutions dans leur vie de tous les jours. Dans ce contexte, il est impératif de s'implanter dans des espaces larges et accessibles. Les stations doivent avoir des entrées et des sorties dégagées. Tous les compartiments doivent être propres. Les salariés doivent être reconnus à travers leur tenue de travail et leurs identifiants personnels (nom, prénoms, etc.) pour faciliter les interactions avec la clientèle.

Ces différents éléments corroborent notre hypothèse de départ stipulant que c'est la qualité de services valorisés par la clientèle qui in fine permet aux entreprises locales confrontées à la concurrence des firmes multinationales de pouvoir supporter la comparaison. Nous considérons ainsi que les propositions que nous nous étions proposés de tester sont vérifiées à travers les résultats de notre étude exploratoire dans les entreprises Elton et EDK au Sénégal.

Conclusion et discussion

Cette étude sur la concurrence entre FMN et entreprises locales nous permet de pouvoir tirer un certain nombre de conclusions. Tout d'abord, il ressort clairement que les entreprises locales peuvent très bien s'en sortir face à des multinationales même dans des secteurs strictement régulés et difficiles. Dans le secteur des hydrocarbures, les entreprises sénégalaises ont réussi la prouesse de tripler et quadrupler leurs parts de marchés cumulées entre 2005 et 2012, respectivement pour les réseaux terre et pêche. En effet, celles-ci sont passées de 12,47% à 37,58% et de 18,37% à 67,09%.

Il ressort notamment de cette étude que les entreprises ne sont guère contraintes de se contenter des miettes que leurs laissent les majors. Dans le secteur de la distribution des hydrocarbures, les entreprises sénégalaises parviennent à élaborer et à dérouler des stratégies ambitieuses qui conduisent à des innovations et à des résultats considérables. S'il est vrai que certaines entreprises locales, à l'instar de Touba oil, finissent par adopter une posture classique, celle de la collaboration avec les multinationales, d'autres par contre préfèrent s'opposer à elles frontalement.

Les entreprises multinationales disposent généralement de moyens nettement supérieurs à ceux des entreprises locales. Ces dernières s'appuient donc généralement sur des connaissances spécifiques (Vargo et Lusch, 2008c), des spécificités socioculturelles (Dawar et Frost, 1999 ; Lavie et Fiegenbaum, 2000) et de la proximité émotionnelle (Dawar et Frost, 1999 ; Xie et White, 2005 ; Xie et White, 2010 ; Barki et al., 2012) pour pouvoir s'affirmer sur leur marché domestique. Nos résultats montrent cependant qu'il faut manifester une bonne attitude professionnelle et avoir une utilité sociétale auprès des communautés où sont implantées les entreprises. Ces résultats constituent des apports utiles par rapport aux travaux antérieurs qui ont souvent considérés que les entreprises locales doivent focaliser leur attention sur les stratégies suivantes : profiter de la flexibilité de leur réseau de distribution (Dawar et Frost, 1999 ; Lavie et Fiegenbaum, 2000 ; Li, 2002 ; Grosse, 2003 ; Jaffe et al., 2005 ; Xi et White, 2005, Barki et al., 2012) ; bâtir leur argumentation commerciale à travers leur proximité culturelle (Arindam et al. 2008) suivant une communication plus adaptée (Dawar et Frost, 1999 ; Xie et White, 2005 ; Xie et White, 2010 ; Barki et al., 2012), tout en respectant la culture et les croyances locales (Lavie et Fiegenbaum, 2000 ; Xie et White,

2005, 2010 ; Wu et Pangarkar, 2006 ; Zhang, 2008) ; en définitive, adapter l'offre aux réalités locales (Ramamurti, 2012).

La pertinence de la SDL est clairement mise en exergue au niveau des stratégies élaborées et déroulées par les entreprises locales. Le service est considéré comme étant au cœur de la relation. Celle-ci n'est pas qu'une simple relation d'échange d'un produit contre rémunération, elle devient un partenariat qui consiste en un échange de service. Les différents acteurs en jeu sont alors considérés comme des parties prenantes ce qui rend caduque la dichotomie offreur/consommateur. Celui que l'on qualifie jusque là de consommateur, devient donc un co-créateur du service au travers duquel est proposée une solution à son problème à travers des expériences uniques et riches.

Il faut cependant se rendre à l'évidence que les entreprises locales n'ont pas l'exclusivité des avantages concurrentiels construits et perceptibles au sens d'une approche SDL. Les multinationales ont très souvent une longueur d'avance par rapport à certains aspects. Dans le secteur de la distribution des hydrocarbures au Sénégal, on peut relever les partenariats que les majors ont noué avec des multinationales d'autres secteurs d'activités. Ces partenariats aboutissent généralement à une offre de service alléchante, à travers des ventes croisées, et unique dont les entreprises locales auront du mal à surmonter. C'est notamment le cas des partenariats entre Total et certaines entreprises de droit français ou des filiales d'autres multinationales : le partenariat Total-orange, permettant au client de bénéficier d'avantages auprès de l'opérateur de téléphonie en achetant son carburant dans les stations Total, ou encore celui entre Total et Eiffage permettant au premier d'avoir l'exclusivité pour implanter des stations tout au long de l'autoroute A1 exploitée par l'entreprise de Génie civil. Ces « ententes » entre FMN sont le plus souvent qualifiées d'injustes ou de déloyales par la concurrence locale, à son égard. Elton et EDK sont à la tête de coalition comportant des membres de la société civile locale et demandant à l'État de prendre des mesures visant à protéger les opérateurs nationaux en réglementant les conditions de partenariat entre firmes de secteurs différents.

Les orientations stratégiques des entreprises locales sont de plus en plus copiées par les FMN qui ont tropicalisé leur management, ouvert les capitaux de leurs filiales à des opérateurs économiques nationaux et revendiquent de plus en plus une utilité sociale au niveau local. Cela montre que la bataille est permanente entre entreprises locales et FMN obligeant les

premières à adopter une propension à innover régulièrement afin de maintenir la pression sur les FMN.

En dépit de ses apports théoriques et managériaux, notre étude pourrait être enrichie en allant notamment au-delà du point de vue des entreprises locales en interrogeant les clients ainsi que les entreprises multinationales afin de mieux apprécier les leviers sur lesquels les stratégies des nationaux doivent être bâties dans le contexte spécifique des pays en développement.

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G3: Innovation Dynamics in Public Services and Governance

Chair: Céline Merlin-Brogniar

Innovation in Public Services: A descriptive analysis of award-winning innovative experiences in Brazil

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This paper provides a descriptive analysis of innovative initiatives performed by Brazilian public organizations and awarded in the Innovation Contest in Public Federal Administration over the last 15 years (1999-2014). The analysis performed provides a set of characteristics of the public sector in Brazil, which includes a focus on back office initiatives and on incremental and improvement innovations. Complementary elements, such as barriers, facilitators and inductors to the innovations are also described. We also provide a discussion of possible pathways for incentivising relevant innovations in the Brazilian public sector, as well as suggestions for future studies in this theme.

1. Introduction

The Innovation Contest in Public Federal Administration is an action of the National School of Public Administration (ENAP – Escola Nacional de Administração Pública), together with the Ministry of Planning, Budget and Management, targeting entities of the Federal Executive Power, in any location on the national territory (Petrucci; Rua, 1998). The first contest was executed in 1996 and it was named National Contest of Innovative Experiences of the Federal Public Administration, and it was promoted in order to identify, reward and publish successful innovation initiatives performed by Federal Executive Power organizations, as well as value public employees by recognizing their initiative and performance (Petrucci; Rua, 1998). From 1999 forward, the contest went into a new phase, where its main goal was to recognize best practices. On this edition, and every edition after, the initiatives were judged by the success, quantitative and qualitative, measured by performance indicators specified correctly.

The ENAP prize has an evaluation process for the initiatives that consists of five steps. In the first stage, application go through an internal screening, in which the constant basic requirements of the regulation are verified, such as minimum implementation time, not having an award in another edition of the contest, belong to the federal executive branch, among others. The second step is an initial assessment of the reports by the Judging Committee, which grades each criterion in order to select the 20 initiatives that will receive the visit of the Technical Committee. In the third stage, teams of two members from the Technical Committee visit the 20 selected initiatives. During the site visit, the technical evaluators aim to investigate and deepen the information contained in the report, as well as answer any questions from the members of the Judging Committee, who receive and evaluate the technical visits reports in the fourth stage. The fifth step is a meeting of the Judging Committee, with

the participation of the technical evaluators in order to increase the knowledge on the initiatives and to support the choice and classification of the ten award-winning innovations (Pereira, 2013).

The Innovation Contest in Public Federal Administration is not an idea contest, but of practices that are already working (Moraes, 2004). Using the knowledge of this contest, and having as an assumption that an innovation happened in all awarded experiences, this study aims to provide a description of this experiences. With this description, we expect to identify the administrative structure and general characteristics of the public organizations with awarded innovation, as well as highlight the main types, barriers, facilitators, inductors and benefits of the innovations from the selected experiences. This paper attempts to provide an overall understanding of the past and present characteristics of innovation with a high degree of relevance in the Brazilian public sector, which can potentially serve as a basis to the definition of future trends for the innovations in this context.

To this end, this paper is structured as follows. After this introductory section, we present a brief overview of the innovation in public services field, followed by a description of the methods employed in this study. We present, in the methods section, a detailed description, using keywords, of the categories used for coding the experiences. All the descriptive analysis are presented after. Finally, in the last session, we present our conclusions, highlighting potential future trends for innovation in the Brazilian public sector, as well as suggestions for future studies in this area.

2. The present state of innovation in public services

Innovation in the public sector has been defined as the creation and implementation of new processes, products, services and service delivery methods that result in a significant improvement on efficiency, effectivity and efficacy of results (Mulgan; Albury, 2003). Innovation is a tool to achieve the purposes of the public service, and, for innovation to occur effectively, a synergic relationship between leadership, management, human resources and technology must exist (Anggadwita; Dhewanto, 2013). In this sense, the implementation of innovations in the public sector provides considerable opportunities for economic growth and attract investors (Avlonitis *et al.*, 2001). To Koch and Hauknes (2005), innovation is the implementation or performance of a new way of social action, which is implemented by an entity in the context of its objectives and activity functionalities. Different from the private sector, the public sector involves a complex and multifaceted process of decision making and performance assessment about the innovation implementation, besides being characterized as work intensive and decentralized, which implies directly on management difficulties (Nelson; Yates, 1978).

Gallouj and Zanfei (2013), in investigating the gaps in the innovation in public sector literature, suggest that there is a need of more studies about public services in order to answer issues related to theoretical, empirical, methodological and political gaps. Other authors, such as Djellal *et al.* (2013), also raise a few arguments to the growth of the field. Firstly, is paradoxical to believe that public administrations are ambivalent in the sense of wanting to support innovation, but ignore innovation to its own benefits. A hypothesis raised in this point is if an administration that innovates for itself can

better support innovation in other economic agents, in a perspective that approximates to the inversion approach proposed by Gallouj (2010). Second, there are some specific sectors in public services in which innovations are indisputable and well documented, but not necessarily on innovation studies, such as public universities and health services (Rosenberg; Nelson, 1994; Djellal; Gallouj, 2007). The third argument refers to the blurring of limits between public and private services, being observable, in some cases, competition between public and private services. This could limit, for example, the lack of competition in the public sector as an innovation barrier. Lastly, economic and demographic crisis can be seen as important factors to the innovation in public services, seen that they lead to society pressure.

Due to the lack of specific studies in this area, some concepts derived from other streams of the innovation theory can be useful to the understanding of innovation in the public sector (Koch; Hauknes, 2005). The integration or synthesis approach, initially proposed by Gallouj and Weinstein (1997), provides an analytical framework that allows the study of any kind of innovation, goods or services. This perspective can be easily amplified to public services, especially when the borders between public and private services become more blurred. The integration approach has been improved in the last years, in some cases with the explicit goal to better reflect the public services, and it has been applied to many public services (Djellal *et al.*, 2013).

3. Method

To achieve the proposed objective for this study, we collected data about the award-winning experiences on the ENAP prize from 1999-2014, totalizing 206 selected cases. The first three editions of the prize were discarded because they presented only a brief account of the experiences and did not fit the standard of description adopted from the fourth edition forward. On the editions from the last 15 years, each step of the case is described in distinct topics, namely: introduction, characterization of the previous situation, description of the experience, proposed objectives and desired results, actions taken, implementation steps, resources used, characterization of the current situation and lessons learned. According to Flick (2009), this is one of the limitations of the document analysis, as available resources may force researchers to be selective, instead of using all available documents.

The information obtained on these selected cases were categorized by a content analysis, using the three steps described by Bardin (2006). First, we executed a pre-analysis, consisted of the selection of documents described previously, and the organization of the material in order to make it operational. Next, we proceeded to the exploration of the material, in which we defined categories, or coding systems, and identified registry units, which are the units of meaning to be encoded in correspondence to the content segment aimed at categorization. The Innovation Type category was established after a literature review, from which the Gallouj and Weinstein (1997) typology was chosen for the coding procedures. The other categories presented on Table 1 were built from the content analysis, and only after were compared to the literature to validate the variables chosen to the present study. Besides the variables presented on Table 1, data about Levels of Government, Administrative Structures and Thematic Areas were collected directly from the experiences' reports and did not have to be treated through the coding procedure. The final step was data

treatment, inference and interpretation, being these phase destined to the condensation and the highlight of information for analysis, leading to the descriptive interpretations presented on the next section.

In order to obtain the highest level of reliability to the data collection process, a researcher triangulation was executed. According to Denzin (1989), to perform such triangulation, different scholars are employed to detect or minimize biases from the researcher as a person. In our case, twelve members from a research group of the University of Brasilia, which specializes, among other themes, on innovation studies, performed the coding procedures independently from each other. Any difference in categorization was discussed in the group meetings in order to achieve consensus on the categories, avoiding biases by any singular researcher.

After the coding procedure, the data collected was inserted in a database. Each category is presented in a binary format, in which 1 means the presence of that category in the correspondent experience, and 0 means its absence. The choice for the binary format was based on the variables which do not have mutual exclusive categories, such as Barriers, Facilitators, Inductors and Benefits. For these variables, it was possible to find none, one, or more than one categories at the same case. For the Innovation Type variable, a singular category had to be selected per experience. The remaining variables, Level of Government, Administrative Structure and Thematic Area were part of the experiences' report submitted, and didn't have to be coded by the researchers.

3.1. Categories' description

A standard description and defined keywords, borrowed from the academic and legal literature, for each category within each variable was provided to all coders in order to guarantee a levelled knowledge between all participant researches. This description aimed at solving any doubts pertaining the definition of the categories, as well as ensure a better and standard coding procedure for all researchers. The keywords of the categories coded is provided on Table 1.

INNOVATION TYPE	
Category	Keywords
Incremental	Implementation; addition; exchange or substitution of elements
Improvement	Improvement; optimization
Radical	New; novelty; unprecedented; different
Formalization	Standardization: unification; clarification; ordering of characteristics
Recombinative	Reutilization; junction; combination of characteristics
Ad Hoc	Problem solution; consultancy; particular problem; error correction
BARRIERS	
Category	Keywords
Resistance	Resistance; distrust; insecurity; fear; lack of commitment; breaking paradigms; culture change; functional instability; refusal; discredited; fear; unbelief
Human resources limitation	Lack of skilled labor; lack of qualifications; lack of specific technical training; workload; lack of resources for hiring; high turnover; ignorance of the process; unpreparedness; human error; team work challenge; inexperience
Infrastructure, material and technological resources limitation	Lack of material resources; lack of material resources; lack of technological resources; lack of structure; lack of information structure; need of constant improvement of technology; lack of resources; lack of infrastructure; insufficient equipment; limited use of tools
Conflic of interests	Conflict of interest; lack of support; public management model; difference of opinion; assignment conflicts; tampering; negotiation among multiple actors;
Data and systems fragmentation	lack of standardization systems; lack of standardization of information; unregistered information; inconsistency of data and information; computer problems; diverse data sources; scattered information; data collection difficulty; absence of concrete information; bank of unreliable data; database absence
Routine and processes fragmentation	Bureaucracy; bureaucratic process; non-standardized processes; difficulty in data transfer; difficulty in processing information; different methods; consolidated culture of absence
Financial and budgetary limitation	Lack of financial resources; lack of budget provision; commercial difficulties; lack of resources; credit contingency; funding challenge
Deadline limitation	Delay in response to demands; failure to comply with time; short-term; very short space of time; narrow term
FACILITATORS	
Category	Keywords
Resource availability	Internet; public funding; budget provision; use of free technologies; available technology; use of the tool
Teamwork	Dialogue; partnerships; interdepartmental work; shared management; decentralization; involvement and participation of all stakeholders; work group; teamwork; participatory development; trading space
Legitimacy and commitment	Motivation; awareness; responsiveness; stimulus; participation; commitment; technical support; government support; political will; membership; cooperation; engagement; dedication; personal commitment; interest

People and competences development	Training; learning; technical capacity; competence; organizational learning; continuous training; leadership
Institutional communication	Communication; providing information; transparency; effective communication; data dissemination; disclosure
Data and processes standardization	Methodology dissemination; immediate application; structured routine; process control; detection and correction of problems
INDUCTORS	
Category	Keywords
Non-problem oriented	Process improvement; routines improvement; improvement of objective achieving
Problem oriented	External environment pressures; internal pressures; adaptations; adjustments
Legal imposition	Regulation; control programs; inflexibility; regulatory strategy; law creations
Political impulse	Political change; political exigence; norm compliance
Technological factors	Technology substitution; technology implementation; routines and processes improvement
BENEFITS	
Category	Keywords
Service delivery and/or quality improvement	Improvement of services offered; efficiency and effectiveness in the management of services; higher productivity; cost-effectiveness; commitment of actors; increased knowledge, adaptability and capacity to deliver
Organizational management improvement	Workforce motivation; effective coordination and collaboration; greater management control; decision making effectiveness; communication management effectiveness
Institutional relations and image improvement	Growth of prestige; accountability; increased ethics and transparency in the management of services; respect and growth capacity; professionalism and expertise
Organizational climate improvement	Creation of reward systems; creativity encouragement; increased autonomy; sufficient resources to perform the tasks; low pressure on employees; research support to perform new tasks

Table 1. Variables, categories and keywords for information coding

4. Analysis

Our analysis consists of descriptive observations based on the count of frequencies for the categories on each variable. These descriptions provides us an initial understanding of the structure of the award-winning public sector innovations in Brazil, and based on this first level of analysis we can infer some characteristics and future trends for these public services.

The first variable analysed is the level of government. This variable consists of two categories: central government, which is composed of organizations located in the Federal District, and local government, composed of organizations located outside the Federal District. The results of this variable shows that central government organizations represent the majority of those awarded in the ENAP prize. This can be due to some reasons. First, ENAP, the institution responsible for the prize, is located in the Federal District, and the divulgation of the prize can have a bigger diffusion through organizations near it, meaning that more central government organizations would have knowledge of the prize and submit their experiences. Second, central government organizations tend to be bigger in size than the local government organizations, and, due to their size, it is possible that the same institutions are submitting many experiences, and the smaller local government organizations are focused on fewer strategic innovation initiatives. Third, many of the actions taken by the government to give incentives to innovation on the public sector, as is the case of the prize, start at the central level, and these organizations will have easier access to knowledge, systems and practices to help establish their own strategic initiatives. In a general sense, we observe the need to work on the diffusion of innovative structures and practices to local government organizations, especially in a continental country as Brazil, where a high percentage of the population is not directly affected by organizations located in the Federal District. Table 2 shows the distribution of cases on the variable levels of government.

Level of Government	No. of cases	%
Central Government	123	59.7
Local Government	83	40.3
Total	206	100.0

Table 2. Levels of Government

Our second analysis consists on observing the administrative structure of the organizations awarded. This variable is composed of two categories. Direct structure refers to services integrated in the administrative structure of the Presidency and the Ministries. Indirect structure is composed of entities with their own juridical person, such as autarchies, public companies, mixed economy societies and public foundations. The percentages of this variable are close to those observed in the level of government. Since most of central government organizations have direct structure, this result was expected. The difference in the number of cases is due to indirect structure organizations located in the Federal District. The results for administrative structure are presented in Table 3.

Administrative Structure	No. of cases	%
Direct	111	53.9
Indirect	95	46.1
Total	206	100.0

Table 3. Administrative Structures

On thematic area, there are five categories. These areas are defined by the prize, and each organization must point the theme closest to its experience at the moment of the case submission. The most incident category was processes optimization and improvement, which refers to the establishment of quality parameters, analysis and implementation of continuous improvement, and simplification and streamlining of procedures. The second most used category was a close one, organizational planning and management, related to initiatives focused on strategic planning, strategic management, budgetary and financial management, cost management, knowledge management, construction and application of management indicators, and performance assessment and institutional results control. The finalistic categories, service delivery and public policy, which refer, respectively, to processes aiming at directly answering the citizens and experiences on creation and implementation of monitoring or evaluations systems to public policies, came in third and fourth place. The least incident category was information management, pointed in experiences about management computerization and use of technologies to redesign processes and to open communication channel with citizens. Although there is a small percentage difference among the categories, they are roughly evenly distributed. Nevertheless, we can observe a preference for initiatives focused on back office improvements, which can, arguably, have an indirect effect on the finalistic areas, such as service delivery and public policy. Table 4 provides the distribution of cases among the thematic areas.

Thematic Area	No. of cases	%
Processes optimization and improvement	49	23.8
Organizational planning and management	46	22.3
Service delivery	43	20.9
Public policy	37	18.0
Information management	31	15.0
Total	206	100.0

Table 4. Thematic Areas

On innovation type, we evaluated the cases based on the six categories proposed by Gallouj and Weinstein (1997). The majority of cases (76.7%) were concentrated on two types. The first one, incremental innovations, refer to marginal changes in the system by the addition or substitution of elements. The second, improvement innovation, consists of cases which focus on improvement of certain characteristics without alteration of the system. These results show a trend of Brazilian public organizations to employ initiatives focused on improvement or incremental addition of elements to already existing services. This can be due to the limitation, budgetary, legal, and otherwise, to the creation of new services, and the need for development of services already offered, be it from the addition or substitution of elements such as IT systems, or from the overall improvement of the service. Radical innovations, referring to the creation of a totally new service, computed 9.7% of total cases, and formalization innovations, which compiles cases which implementation gives visibility and optimizes

the degree of standardization of the system's characteristics, represented 8.7% of the experiences. The types with least occurrences were recombinative, the systematic reutilization of certain elements of the service, and ad hoc, which is an interactive construction of a particular problem of a determined client. These two categories represented 2.4% of the cases each. Table 5 compiles the results for innovation types.

Innovation Type	No. of cases	%
Incremental	81	39.3
Improvement	77	37.4
Radical	20	9.7
Formalization	18	8.7
Recombinative	5	2.4
Ad Hoc	5	2.4
Total	206	100.0

Table 5. Innovation Types

One of the aspects that allows us to dive deeper on the structure of innovative cases in Brazilian public organizations is the barriers identified by these organizations during their experiences. Since the same case can have none, one, or more than one barriers at the same time, the total number of barriers computed exceed the number of selected cases, totaling 322 barriers. Close to half the initiatives (42.2%) listed resistance as a barrier, referring to lack of trust, of openness to new ideas and even reluctance to adopt new systems. When added to conflict of interests, which appeared in 19.9% of the cases, we can start to observe a hypothetical need for a cultural change on Brazilian public organizations in order to make it more acceptable and desirable to have changes in the systems currently in place on this institutions. Limitation of resources, be them human, infrastructure, material and/or technological resources, is also an issue pointed by 33.7% of the cases. If we accept the hypothesis of cultural resistance, this could mean that, due to resistance and conflict of interests, the ecosystem of public organizations offer few resources to these institutions to allocate in innovative initiatives, which can then generate the lack of resources observed. One point of notice is that deadline limitation appeared in only 4.4% of the cases. A possible explanation for this low frequency is that most of the innovation initiatives still happen, or at least start, in non planned contexts, and deadlines are not clearly, or at all, established. Therefore, there is low pressure to meet these deadlines during execution of the experiences. The results for barriers are shown in Table 6.

Barrier	No. of cases	% (of 206)	% (of 322)
Resistance	87	42.2	27.0
Human resources limitation	46	22.3	14.3
Infrastructure, material and technological resources limitation	44	21.4	13.7
Conflict of interests	41	19.9	12.7
Data and systems fragmentation	36	17.5	11.2
Routine and processes limitation	34	16.5	10.6
Financial and budgetary limitation	25	12.1	7.8
Deadline limitation	9	4.4	2.8
Total	322	156.3	100.0

Table 6. Barriers

A complementary analysis to identifying barriers is describing the facilitators to innovation initiatives. Seen that the same case can have none, one, or more than one facilitators at the same time, the total number of facilitators computed exceed the number of selected cases, totaling 449 facilitators. On more than half the cases (55.8%), resources availability was listed as a facilitator to the experience. This can be a reflection of the resources barrier, which wasn't a major category in the barrier variable. Next, teamwork appears in 46.6% of the cases, followed by legitimacy and commitment, in 39.3% of the experiences. The results of legitimacy and commitment helps describe the resources availability, seen that projects that are legitimated by the leadership of the organization may have access to more resources. This also presents more opportunities to the people involved in the project, which can also help with teamwork. The facilitator least listed was data and processes standardization. This, in addition to the most used thematic area, and the types of innovation most incident, suggests that redesign and standardization of processes is an issue of great importance to Brazilian public organizations. Table 7 shows the frequencies for the facilitator variable.

Facilitator	No. of cases	% (of 206)	% (of 449)
Resources availability	115	55.8	25.6
Teamwork	96	46.6	21.4
Legitimacy and commitment	81	39.3	18.0
People and competences development	71	34.5	15.8
Institutional communication	49	23.8	10.9
Data and processes standardization	37	18.0	8.2
Total	449	218.0	100.0

Table 7. Facilitators

To this point, many of the analysis performed identify characteristics of the innovation process. The inductors give a sense of what happens before the initiative begins. The most incident inductors, with similar frequencies, are non-problem oriented and problem oriented. These represent opposite inductors. A non-problem oriented refers to an initiative that begins not to solve a specific problem, but works on the opportunity to generate improvements. On the other side, a problem oriented is an initiative aimed at solving a specific problem, usually responding to an external pressure. The similar frequencies on these categories represent that both scenarios generate innovation experiences in the public sector. A few complementary categories that appeared with less frequency were legal imposition and political impulse, which are a kind of external pressure, but specific on the political and legal contexts that force an innovation to happen. The low counts on these categories suggest a still low interest of the political representatives to induce, in a direct way or indirectly through laws, for example, innovation projects in the public sector. The counts for each inductor are presented on Table 8.

Inductor	No. of cases	% (of 206)	% (of 221)
Non-problem oriented	88	42.7	39.8
Problem oriented	84	40.8	38.0
Legal imposition	24	11.7	10.9
Political impulse	14	6.8	6.3

Technological factors	11	5.3	5.0
Total	221	107.3	100.0

Table 8. Inductors

Our last analysis focused on the end of the innovation process, describing the benefits generated by the initiatives. Most of the experiences listed service delivery and/or quality and organizational management improvement as benefits from their projects. Although the service delivery thematic area was computed in only 20.9% of the experiences, being the most listed benefit gives strength to the hypothesis that the innovation projects, even though are focused in other areas of the organization, generate effects on the front office of the institutions. The other side of this description falls on the organization management improvement benefit, and demonstrates that these two objectives can be tackled at the same time when executing an innovation project. Institutional relations and image improvement was listed in 40.8% of the cases. Although the majority of initiatives were not focused on the image of relations of the organization, and this is not even a thematic area listed by the prize, this is a side benefit generated in many of the initiatives. Only 16.5% of the cases were listed as creating an organizational climate improvement. This also reflects the nature of the projects analysed, which focus on creating better processes and using them to impact the service delivery, but not necessarily focusing on the workforce of the organization. At the same time, teamwork was the second most frequent facilitator, which suggests that initiatives focusing on this benefit can improve an important facilitator to leverage another innovation experiences. Table 9 shows the results for benefits.

Benefit	No. of cases	% (of 206)	% (of 403)
Service delivery and/or quality improvement	144	69.9	35.7
Organizational management improvement	141	68.4	35.0
Institutional relations and image improvement	84	40.8	20.8
Organizational climate improvement	34	16.5	8.4
Total	403	195.6	100.0

Table 9. Benefits

5. Conclusions

This paper's objective was to provide an overall understanding of the characteristics of innovation initiatives in the Brazilian public sector. To this end, we performed a series of descriptive analysis based on the results of the Innovation Contest in Public Federal Administration from the National School of Public Administration over the last 15 years (1999-2014). A few main observations on these data can be made.

First, we see a slightly higher number of innovations performed on the Central Government and, consequently, of organizations with a Direct Structure. This was expected due to the proximity of Central Organizations with the prize, which is promoted by a public organization located on the Federal District, and the proximity with other relevant public organizations that incentivize innovations in the public sector, such as the Ministry of Science, Technology and Innovation and the Ministry of Plan-

ning, Budget and Management. These two, among many others, are Central Government organizations that not only are responsible for many of the innovative initiatives in the Brazilian public sector, but also support many other experiences in different organizations. Even though this result was expected, a more structure diffusion of the prize and initiatives from supporting organizations could make it more feasible for Local Government organizations to perform more relevant innovation initiatives and produce award-winning cases.

We also observed a focus on back office initiatives, characterized mainly by incremental and improvement innovations. These results may suggest a smaller degree of novelty of the innovations performed, as well as less potential for scalability and diffusion of these innovations. We can also hypothesize that Brazilian public organizations have an internal focus on their initiatives, and attempt to achieve better services indirectly through processes and systems improvements. In this sense, a gap of initiatives focused on direct services to the citizens and radical innovations, through the creation of new services or the complete redesign of current services, can be pointed out. On this topic, it is suggested that future studies assess the impact of coproduction and other citizen-focused practices may have on innovative experiences on the public sector, in order to determine if a closer relationship with citizens can provide a better context for radical and front office innovations.

The barriers and facilitators analysis also highlight some interesting characteristics of the experiences selected. Resistance and conflict of interest appear as the main two types of barriers pointed out on the cases. Our hypothesis is that these two barriers can generate the third most cited, lack of resources. A reflection of these barriers are the two most incident facilitators. First, resources availability have the higher count, followed by legitimacy and commitment. If we consider that resistance and conflict of interest are opposites of legitimacy and commitment as lack of resources is to resources availability, a seemingly paradox of similar variables being listed as both barriers and facilitators is presented. In reality, this shows us that the same variables, if available, are important elements to the execution of innovative initiatives, but their lacking cause difficulties to these initiatives. In this sense, a focus on creating a context of political and top management interest and, therefore, legitimacy that can generate a higher availability of resources is necessary to incentivise relevant innovations in the Brazilian public sector.

This paper's limitations include the sample of organizations considered on the analysis, seen that it was limited to experiences awarded in the ENAP prize, and do not represent the totality of Brazilian public organizations. In addition, the analysis performed on this study is descriptive, and the gaps and suggestions made represent only assumptions that need to be tested with other explanatory analyses in order to support or deny the hypotheses listed on this study. To this end, we suggest that future studies complement the descriptions provided in this paper with initiatives from different organizations, using different databases to collect data. We also recommend the analysis of other constructs related to innovation, such as coproduction, as well as more variables related to innovation or different typologies than the ones considered in this study. Lastly, we suggest that future studies perform explanatory analyses to achieve a higher degree of understanding of the characteristics studied.

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Service Innovation Dynamics in Solid Waste Sector: CDM Landfill Projects¹

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Abstract

The aim of this paper is to analyze the service innovation dynamics in the solid waste sector to examine the generation of co-benefits resulting from carbon market projects. Two Clean Development Mechanism (CDM) landfill projects are considered: one public and one private. Indicators are proposed to evaluate the social and environmental outcomes that can be generated from CDM landfills, organized into five themes: participation, stakeholder interaction, benefits, environmental quality monitoring and gas emissions monitoring. Data, collected by applying indicators, are organized and analyzed based on two complementary theoretical frameworks: the characteristics-based model and the public-private innovation networks in services (ServPPIN) concept. The focus on competences and techniques interlinked with services produced highlight the importance of organizational and relational aspects and contribute to a better understanding of the opportunities and limitations of CDM in the waste sector.

Keywords: ServPPIN; public service innovation; clean development mechanism; solid waste sector; landfill.

1. Introduction

The aim of this paper is to analyze service innovation dynamics in the solid waste sector in order to assess the co-benefits generated by carbon market projects. Two Clean Development Mechanism (CDM) landfill projects are considered: Bandeirantes, a public project and Caieiras, a private project.

CDM encompasses activities aimed at reducing greenhouse gas (GHG) emissions by establishing projects across a wide range of sectors, including landfill sites. In line with article 12 of the Kyoto Protocol, these projects must also contribute to promote sustainable development in host countries by generating social and environmental co-benefits.

Although CDM projects have this twofold goal, the United Nations Framework Convention on Climate Change (UNFCCC) only recently began to consider the evaluation of co-benefits generation (UNFCCC, 2012a, 2012b, 2012c).

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According to the Marrakech Accords (Decision 17/CP. 7) the responsibility for determining whether a CDM project activity contributes to sustainable development is defined by the host country and resides with its Designated National Authority (DNA) (UNFCCC, 2001). With regard to participation, the CDM Executive Board requires stakeholders' participation through the entire lifecycle of the activity.

In Brazil, in order to promote local sustainable development the specification of projects must be based on information provided in Annex III of Resolution n.1 of the Inter-Ministerial Commission on Global Climate Change². This establishes both the benefits to the local area and how project activities contribute to each of the following aspects: environmental sustainability; improvement in working conditions and net job creation; income distribution; training and technological development; and finally, regional integration and working in conjunction with other sectors (Brazil, 2003).

Resolution n.1 (Brazil, 2003) also points out the importance of the effective participation of civil society throughout the CDM project's approval process. In the case of Brazil, project proponents should send letters of invitation to all project stakeholders, including local authorities and the chamber of deputies of all municipalities involved; municipal and state environmental departments; NGOs and social movement forums; community associations both directly and indirectly involved in project activities; and State and Federal Public Prosecution Offices.

The Letter of Approval (LoA), a document which confirms that the project contributes to the sustainable development of a particular country, is issued by the DNA and is exclusively based on the expected results (local contributions) of the project in terms of sustainable development and not on verified results.

Within this context, several studies focusing on the analysis of CDM results have demonstrated the difficulties - or even the failure - of GHG reduction projects in contributing to the promotion of local benefits and guaranteeing stakeholder participation (Olsen; Fenhann, 2008; Boyd et al, 2009; Peskett et al., 2007; Kolmuss, 2008; Nussbaumer, 2009; Sutter; Parreño, 2007; Siebel et al., 2013).

In order to address changes in landfills as a result of CDM implementation, 23 indicators are proposed to evaluate the social and environmental outcomes that may be generated by CDM landfills, organized into social and environmental dimensions and subdivided into five themes: three involving the Social Dimension – participation, stakeholder interaction and benefits; and two involving the Environmental Dimension - environmental quality monitoring and gas emissions monitoring.

The data collected by applying these indicators are organized and analyzed using two complementary theoretical frameworks: the characteristics-based model developed by Gallouj and Weinstein (1997), updated by Gallouj (2002) and Gallouj and Savona (2010); and the public-private innovation networks in services (ServPPIN) concept.

This paper is structured into five sections: following this introduction, section 2 discusses the theoretical frameworks used to analyze the public service innovation

² Inter-Ministerial Commission on Global Climate Change is the Designated National Authority (DNA) in Brazil.

dynamics, the characteristics-based model and ServPPIN concept; section 3 focuses on methodology, presenting the empirical cases – the profile of the landfills selected and the identification of stakeholders involved in these landfills - and development and validation of indicators; section 4 shows the results and, finally, our conclusions are set out in section 5.

2. Theoretical frameworks to analyze the public service innovation dynamics: the characteristics-based model and ServPPIN concept

Djellal and Gallouj (2012) highlight the importance of public services according to their social or civic output. For the authors, “Public services ‘outputs’ contribute to social cohesion, solidarity and collective and civic identity” (p. 11).

Another aspect of public service provision is the difficulty in identifying and demarcating activities that should be attributed to the public sector as opposed to the private sector, as many services and activities in the public sector are integrated with the activities of the private sector and vice-versa (Bugge et al, 2010; Potts; Kastle, 2010). This aspect is also observed in services related to municipal solid waste, generally carried out via concessions granted to the private sector.

According to Bugge et al (2010) and Bloch and Bugge (2013) the multi-faceted and heterogeneous nature of the public sector is the result of multiple interfaces which characterize public organizations: 1) interface with the private sector; 2) interface between the public sector and citizens; and 3) internal interfaces within the public sector (between government levels and between different areas of activity). These various interfaces illustrate public sector heterogeneity and the permeability between organizations (private, public and the third sector) (Gallouj et al, 2013).

This study adopted an integrated approach to service innovation. This involves having a global perspective to explain service innovation, providing a broad framework, addressing technological and non-technological innovation and taking into consideration all actors involved in the service.

The purpose of this section is to present: 1) the characteristics-based model, useful to describe the interlinking of the vectors of the service’s competences, techniques and final characteristics; and 2) the ServPPIN concept, useful to identify and systematize aspects related to agent interaction, emphasizing the participation of associations and cooperatives close to the landfills.

2.1 The characteristics-based model

Gadrey (2000), based on service relations, suggests the following services definition:

[...] a service activity is an operation intended to bring about a change of state in a reality C that is owned or used by consumer B, the change being effected by service provider A at the request of B, and in many cases in collaboration with him or her, but without leading to the production of a good that can circulate in the economy independently of medium C” (Gadrey, 2000, p. 375).

Gadrey's (2000) concept of 'the service triangle' helps us to understand service production as a social process which is constructed by the actors participating in the service production process and by the context in which actors find themselves (cultural, social, institutional, economic, etc).

Thus, these relationships, characterized by the interaction between client / user and the service provider, highlight the service interface component, as well as the competences (technical and / or human) required for service provision. In this study, the solid waste service is considered by using Gadrey's service logic (2000) and applying it to the context studied, from its generation through to its final disposal.

According to Gallouj and Weinstein (1997), the product (good or service) is understood from a set of characteristics and competences vectors represented by the "characteristics-based approach". In addition, this model, updated by Gallouj (2002) and Gallouj and Savona (2010), includes the technical characteristics of both providers and customers. In Figure 1, [Y] represents the service characteristics, [T] the internal technical characteristics, [T'] the external technical characteristics, [C] the internal competences and [C'] the external competences.

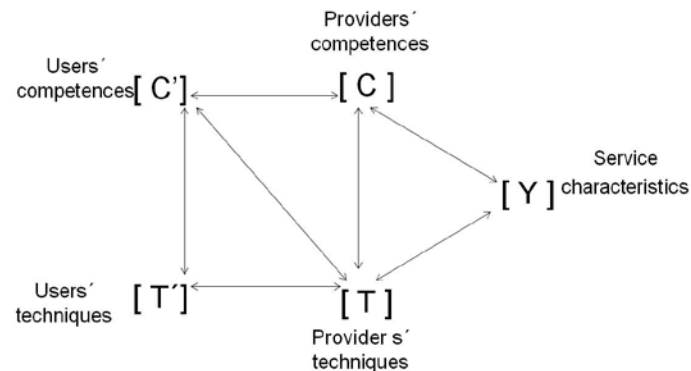


Figure 1: The product as a conjunction of vectors of characteristics and competences (characteristics-based approach)

Source: Gallouj and Savona (2010)

Thus, a service can be defined as the mobilization of internal and external competences and internal or external techniques (tangible or intangible) to produce the final characteristics of a good or service.

A recent contribution to the model was proposed by Windrum and García-Goñi (2008) suggesting the inclusion of the government in the Gallouj and Weinstein (1997) and Gallouj and Savona (2010) model. Windrum and Garcia-Goni (2008) show that the quality of a good or service depends on the sets of competences belonging to service providers / producers and users. Service provider competences are described as *back office* competences and *user facing* competences are emphasized as the competences required to interact with users.

Different types of actors are involved in the innovation process. In this way, the multi-agent service provision model enables the development of complementarities and synergies between the various agents, each with specific goals and competences (Windrum; García-Goñi, 2008; Weber; Heller-Schuh, 2013; Windrum, 2013).

Having outlined the characteristics of multiple interfaces and the heterogeneity of the public sector, the ServPPIN concept can be useful to identify and systematize the aspects related to agent interaction.

2.2 ServPPIN concept

One of the factors behind the interest in examining Public-Private Innovation Networks is the growing recognition of the important role played by public sector organizations in the innovation process. Public administrations are thus no longer restricted to playing a supporting role in innovation processes.

Similar to public-private partnerships (PPPs), ServPPINs are collaborative networks involving public and private organizations. However, in contrast to traditional PPPs, they are more comprehensive, open and flexible. In PPPs, relations between actors tend to be more rigid, involving predefined functions, rules and formal procedures (particularly contracts), making the process more bureaucratic, thus limiting its potential for innovation.

The high number and diversity of participants in a ServPPIN tend to lead to a multi-faceted and intensive process of interaction. Given the many channels that are opened, large amounts of heterogeneous information and knowledge (tacit and non-tacit) are likely to be exchanged. In other words, ServPPIN can be thought of as a multi-agent service relationship system (Djellal; Gallouj, 2013).

The innovation network³ concept is biased towards manufacturing and technology. This concept, in the traditional sense, has a number of deficiencies, namely, a technology bias (where tangible technological innovation predominates), a manufacturing bias (linked to the latter), and a market bias (the private sector is central to innovation dynamics). In short, this means that innovation networks are mainly focused on technological innovation produced by the collaboration of private actors in the manufacturing sector.

The ServPPIN concept provides a way of overcoming these various biases (Djellal and Gallouj 2013; Gallouj et al., 2013; Labarthe et al. 2013, Windrum, 2013). It goes beyond the technologist view of innovation⁴, providing a broader perspective which incorporates non-technological types of innovation such as: organizational, ad hoc (defined by Gallouj and Weinstein (1997) as interactive solutions to the specific problems of particular clients), social and bricolage innovation (defined as innovation resulting from non-programmed activities, trial-and-error processes and adaptation to random events) (Fuglsang, 2010).

³ Innovation networks and systems have been extensively analyzed by literature in the areas of economics, sociology and management (Callon, 1992; Edquist, 1997; Latour, 1999; Lundvall, 1992; Nelson, 1993 among others).

⁴ The technology issue is taken into account in the designs of carbon market projects and in the promotion of social and environmental local co-benefits. In the cases studied, all Project Design Documents (PDD) and Validation Reports indicate the development and dissemination of technologies through project implementation, highlighting the following aspects: training, technology development and transfer.

Through the ServPPIN concept, Gallouj et al (2013) emphasize the importance for service innovation of multiple links and feedbacks (interfaces) between the public and private sectors as well as users – in our case, the association representatives from the communities surrounding the landfills – and policy-makers. As pointed out by Djellal and Gallouj (2013):

ServPPINs are multi-agent service relationship systems. The actors involved in interaction have to deal with the ill-defined nature of their respective products, their non-stockability, a diversity of systems of interaction, the multiplicity of possibly competing value systems and the fact that their products are located in different spatial and temporal scales. ServPPINs introduce the traditional research questions of service economics into network-based analyses of innovation. (Djellal; Gallouj, 2013 p. 30. highlighted by the authors).

Thus, the multi-agent framework is particularly well-suited to studying the public-private innovation networks concept. The Windrum and García-Goñi (2008) model⁵, in particular, (inspired by Gallouj and Weinstein, 1997) is an analytical framework representing interactions between the various agents from the political, economic and social spheres.

In short, this model differs in that it includes the government as an important agent in the innovation process in order to highlight the importance of considering the preferences of different actors. Furthermore, this model also emphasizes the importance of organizational and relational competences - in particular with regard to the interaction between service providers and users - in steering the trajectory of service characteristics.

According to Bučar et al. (2013), ServPPINs can be understood as a space for social interaction and the construction of social relations aimed at innovation. Nevertheless, when considering all case studies studied in the ServPPIN research project⁶, a considerable number were not explicitly oriented towards innovation. For example, in some hospital case studies the main objective was to reduce costs in the use of technologies.

Similarly, the explicit aims of the CDM landfill projects we examined were a reduction in GHG emissions rather than the promotion of service innovation. In fact, technology and innovation appear to be additional outcomes of the local co-benefits generation. Interesting changes and innovations are likely to emerge from such networks which may then be retrospectively labelled 'innovation networks'. With regard to non-technological, incremental and unprogrammed innovations (*ad hoc*, *bricolage*, rapid application etc.), it is also possible to consider even those networks not explicitly (or immediately) oriented towards innovation as ServPPINs.

ServPPIN contributes to introduce the traditional innovation network concept to new actors, that is, market and third sector organizations (NGOs, associations etc.). It extends potential forms of participation to specific actors, for example, civil society, involved in decision-making and consultation processes. This is particularly the case

⁵ See also Windrum (2013)

⁶ ServPPIN is an EU-funded research project which focuses on the role of public and private services on growth and welfare and the particular role of public-private innovation networks. For more information: <http://www.servppin.com/>. The main results of the project are also published in Gallouj, Rubalcaba and Windrum (2013).

with regard to civil society's role in the ServPPIN context – helping to translate social preferences not fully reflected by market prices (Fuglsang, 2013).

In addition to highlighting the importance of integrating users into the service innovation process, the ServPPIN Research Project findings indicate that the participation and involvement of both non-profit organizations and service users (citizens) is still limited. Thus, as argued by Labarthe et al (2013), it is not end-users, or individual users, who are integrated within networks, but rather, the collective organizations representing these groups - and in our case, the representatives of associations of the communities surrounding landfills.

3. Methodology

This section shows, first, the research's geographical boundaries featuring the case studies and stakeholders and, subsequently, the procedures used to validate the indicators for co-benefits evaluation.

3.1. Research Context and Empirical Cases

The São Paulo Metropolitan Area comprises 39 municipalities with approximately 20 million inhabitants, generating around 16,000 tonnes of solid waste per day (Cetesb, 2013). Landfill projects are concentrated in the south-eastern region of the country, 23 of which are located in the State of São Paulo (UNEPRisoe, June, 2015). Thus, our research focuses on the São Paulo Metropolitan Area and outlines two CDM projects. The landfills in this empirical research were selected on the basis of the following criteria:

- a) Project scope: landfill projects;
- b) Location: São Paulo metropolitan area;
- c) Methodology used to measure GHG emissions reduction: ACM0001 – flaring or use of landfill gas;
- d) Monitoring period established: at least one monitoring period to the beginning of the empirical research (February, 2014);

Given the criteria above, the following landfills were selected: Bandeirantes and Caieiras. CDM landfill projects data were collected from 2003 to 2014 and obtained through documentary research using two databases: The United Nations Environment Program (UNEPRisoe) database and UNFCCC - CDM Registry which enabled access to monitoring reports project design documents (PDDs) and project documentation based on Annex III of Resolution No. 01/ 2003 of the Inter-ministerial Commission on Climate Change (CIMGC) (document describing the promotion of social and environmental co-benefits).

In order to map stakeholders, specific and additional information was analyzed regarding the representatives of the associations in the communities surrounding landfills directly affected by the activities of the enterprises. The following databases were examined:

- The recyclable material cooperatives register, available from the Department of Environment of São Paulo State website – SMA⁷;
- The “register of civil society organizations – 2009-2011 database”, available from the Integrated Water Resources Management System (SIGERH)⁸, taking into account data related to the Alto Tietê Basin Committee for the geographical area selected for the study;
- The websites of the municipalities affecting Caieiras;
- The websites of the sub-district Perus (city of São Paulo);
- Public audiences minutes related to carbon credits;
- FEMA (Environment and Sustainable Development Fund) and Confema (Special Fund for the Environment and Sustainable Development Council) resolutions related to CDM projects (in this case, exclusively for Bandeirantes);
- Direct searches with the Google web search engine, using the following keywords: the names of the landfills, cooperatives and associations/communities surrounding the landfills.

3.2. Indicators: Development and Validation

In order to evaluate the social and environmental co-benefits of CDM projects in landfills, 23 indicators were proposed and organized into the social and environmental dimensions and subdivided into five themes:

- Social Dimension: a) Participation, concerns the quality and coverage of the participation of different stakeholders in all phases of the CDM projects development. b) Stakeholder interaction, concerns the interaction between agents involved in the CDM projects, encompassing public and private sectors and users (associations and representatives of civil society, recycling cooperatives; etc.) c) Benefits, concerns the benefits promoted by the CDM with reference to urban solid waste;
- Environmental Dimension: d) Environmental quality monitoring, relates to identifying the potential for reducing negative environmental impacts with regard to the landfill sites; and e) Gas emissions monitoring, concerns the efficiency of the landfills’ biogas capture systems.

The process for developing indicators was participatory: the indicators were presented and discussed with stakeholders and took into account expert validation using the Delphi technique (Linstone; Turoff, 1975; Ristola, 2012; Tuominen et al, 2014). The literature on Delphi clearly indicates that not only (technical) experts may be involved in the validation process, but it may also include decision-makers and other relevant stakeholders able to provide information on the topics covered by Delphi (Linstone; Turoff, 1975; Ristola, 2012, Varho; Tapio, 2013; Tuominen et al, 2014).

In this research, 2 experts participated in the pre-test phase (October, 2014), 10 in the first round (November, 2014), and 9 in the second round (January, 2015). The online questionnaire was divided into two sections with the following main objectives:

⁷ <www.ambiente.sp.gov.br>

⁸ <www.sigrh.sp.gov.br>

a) to evaluate the significance level of the indicator (based on the Likert scale - very low, low, moderate, high, and very high); and b) to qualitatively analyze the indicators' descriptions. The instructions given to evaluate the indicators were, essentially: a) to analyze the indicators' description; and b) to evaluate the indicators' level of significance. Table 1 shows the indicators organized into social and environmental dimensions and into the five topics – participation; stakeholder interaction; benefits; environmental quality monitoring; and gas emissions monitoring.

Table 1: Proposed indicators subsequent to Delphi rounds.

Social Dimension		
Topic I: Participation		
Indicators	Description	Variables
Number of participants and stakeholders involved	Identifies the number of participants both in meetings and public audiences related to CDM projects; and participants and stakeholders involved	Number of participants in the meetings; number of participants in the public audiences related to CDM projects
Channels for recording complaints	Identifies the Number of complaints / year; % of complaints resolved in order to first, evaluate the existence of channels for recording complaints and second, to identify responses	Number of complaints / year; % of complaints resolved
Projects' acceptance by the population and environmental non-governmental bodies	Identifies the Number of formal complaints and/or suggestions / year by the population and environmental non-governmental bodies related to CDM projects	Number of formal complaints / year; Number of formal suggestions / year
Disclosure to stakeholders of the activities proposed in PDD, based on Annex III aspects	Identifies the Number of published documents (including digital media) disclosing to stakeholders the activities proposed in the PDD based on Annex III aspects in order to evaluate whether actions are disclosed to stakeholders, as well as the means of communication used	Number of published documents
Language and clarity of documents	Identifies suitability of documents; evaluates the language and clarity of key documents related to the project	Suitable; unsuitable
Consultation period	Identifies the suitability of the public comments and consultation period - 30 days - established by the UN / UNFCCC (after validation by the Designated National Authority)	Suitable; unsuitable
Public consultation before implementation and during project execution	Identifies the Number of meetings conducted in order to evaluate whether users were consulted before the implementation and during project execution; the level of stakeholder satisfaction with the consultation conducted; and whether the landfill post- closure plan was participatory and included the communities surrounding the landfills	Number of meetings; satisfactory, not satisfactory
Topic II: Stakeholder Interaction		
Indicators	Description	Variables
Communication between municipal departments	Identifies the Number of meetings and / or number of published and/ or disclosed documents in order to evaluate whether there is Communication between municipal departments on the CDM projects	Number of meetings; Number of joined up initiatives and activities focusing on CDM projects
Communication between municipal departments and concession-holders managing the landfills	Identifies the Number of meetings and / or number of published and/ or disclosed documents in order to evaluate whether there is Communication between municipal departments and concession-holders managing the landfills	Number of meetings and / or number of published and/ or disclosed documents
Communication between municipal departments and representatives of associations from the communities surrounding the landfills	Identifies the Number of meetings and / or number of published and/ or disclosed documents in order to evaluate whether Communication between municipal departments and representatives of associations from the communities surrounding the landfills exists; and the level of stakeholder satisfaction with	Number of meetings and / or number of published and/ or disclosed documents

	procedures adopted	
Communication between municipal departments and concession-holders responsible for LFG ⁹ recovery and power generation	Identifies the Number of meetings and / or number of published and/ or disclosed documents in order to evaluate whether Communication between municipal departments and concession-holders responsible for LFG recovery and power generation exists	Number of meetings and / or number of published and/ or disclosed documents
Communication between concession-holders managing the landfills and concession-holders responsible for LFG recovery and power generation in relation to the landfill closure plan	Identifies the Number of meetings and / or number of published and/ or disclosed documents in order to evaluate whether Communication between concession-holders managing the landfills and concession-holders responsible for LFG recovery and power generation in relation to the landfill closure plan exist	Number of meetings and / or number of published and/ or disclosed documents
Communication between concession-holders responsible for LFG recovery and power generation and representatives of associations from the communities surrounding the landfills	Identifies the Number of meetings and / or number of published and/ or disclosed documents in order to evaluate whether Communication between concession-holders responsible for LFG recovery and power generation and representatives of associations from the communities surrounding the landfills exists	Number of meetings and / or number of published and/ or disclosed documents
Topic III: Benefits		
Indicators	Description	Variables
Cooperatives benefiting from CDM revenues	Identifies the number of Cooperatives benefited and the number of people benefited in order to verify whether CDM landfill projects have benefited cooperatives surrounding the landfills	Number of Cooperatives benefited/ Number of people benefited
CDM projects contributions to environmental education initiatives	Identifies whether CDM landfill projects contributed to improve/develop environmental education initiatives; Number of people benefited; training; in order to verify projects' contribution to environmental education initiatives aimed at USWM ¹⁰ ; and the level of stakeholder satisfaction	Number of environmental education initiatives provided by CDM; Number of people benefited; Training;
CDM projects contribution to technology and methodology development	Identifies the number of technologies and methodologies developed by landfill CDM projects	Number of technologies and methodologies
Environmental Dimension		
Topic IV: Environmental quality monitoring		
Indicators	Description	Variables
Surface and underground water monitoring	Identifies the number of Samples taken every months and the Number of nonconformities every 6 months, obtained from surface and underground water monitoring results	Sampling / 6 months; Number of nonconformities/ 6 months
Leachate monitoring	Identifies possible changes in leachate (litres / hour) provided by monitoring results throughout the project development period	Nonconformities samples during the entire project development period
Geotechnical monitoring: soil stability	Identifies the Samples taken every 6 months and the Number of nonconformities every 6 months obtained from the geotechnical monitoring results on soil stability in order to prevent accidents caused by landfill slope movements	Sampling /every 6 months; Number of nonconformities/ 6 months
Landfill closure plan	Identifies Suitability of compliance with landfill closure plan	Suitable; unsuitable
Odors	Identifies air quality (odors) monitoring; the quality of data obtained; and the number of complaints / year by stakeholders regarding unpleasant odors.	yes; no; Suitable; unsuitable; number of complaints / year

⁹ Landfill gas

¹⁰ Urban solid waste management

Topic V: Gas emissions monitoring		
Indicators	Description	Variables
Fugitive gas emissions	Identifies volume of fugitive gas every 3 months from monitoring results	volume of fugitive gas / 3 months
Biogas capture	Identifies the amount of biogas captured Nm ³ /year, allowing for adjustments and corrections in the landfill gas drainage system in order to eliminate odors	volume of biogas captured Nm ³ /year

During the two Delphi rounds, the answers provided by the experts in accordance to the Likert scale were tabulated using the Minitab® statistical software and statistically represented by the median, the first and third quartiles. At the end of two rounds, the interquartile ranges were analyzed - comparing the differences between the first and third interquartile of the first and second rounds. Qualitative data on indicators descriptions were compiled in order to identify trends and / or discrepancies between Delphi participants' responses. Stakeholder data were collected in face-to-face interviews through the application of a semi-structured questionnaire in April 2015.

4. Results

This section will first present the results of the characteristics-based approach model adapted to the CDM landfill context, followed by results based on the ServPPIn concept, in order to identify the promotion of social and environmental co-benefits through innovation and stakeholder participation.

4.1. The characteristics-based approach model adapted to the CDM landfill context

The Gallouj and Weinstein's (1997) characteristics-based approach model and additional contributions were adapted¹¹ to the CDM landfill context in order to analyze competences and techniques and examine the potential mitigation of environmental impacts resulting from this activity, taking into account soil, air, surface and groundwater contamination.

Considering the context studied, is it important to highlight the relevance of regulations (especially aimed at controlling odors emissions and gas monitoring) affecting the use and selection of techniques by direct and indirect service providers. Figure 2 shows the representation of products related to solid waste final disposal in the CDM landfills:

¹¹ Contributions made by Gallouj (2002), Gallouj and Savona (2010), and Windrum and Garcia-Goñi (2008).

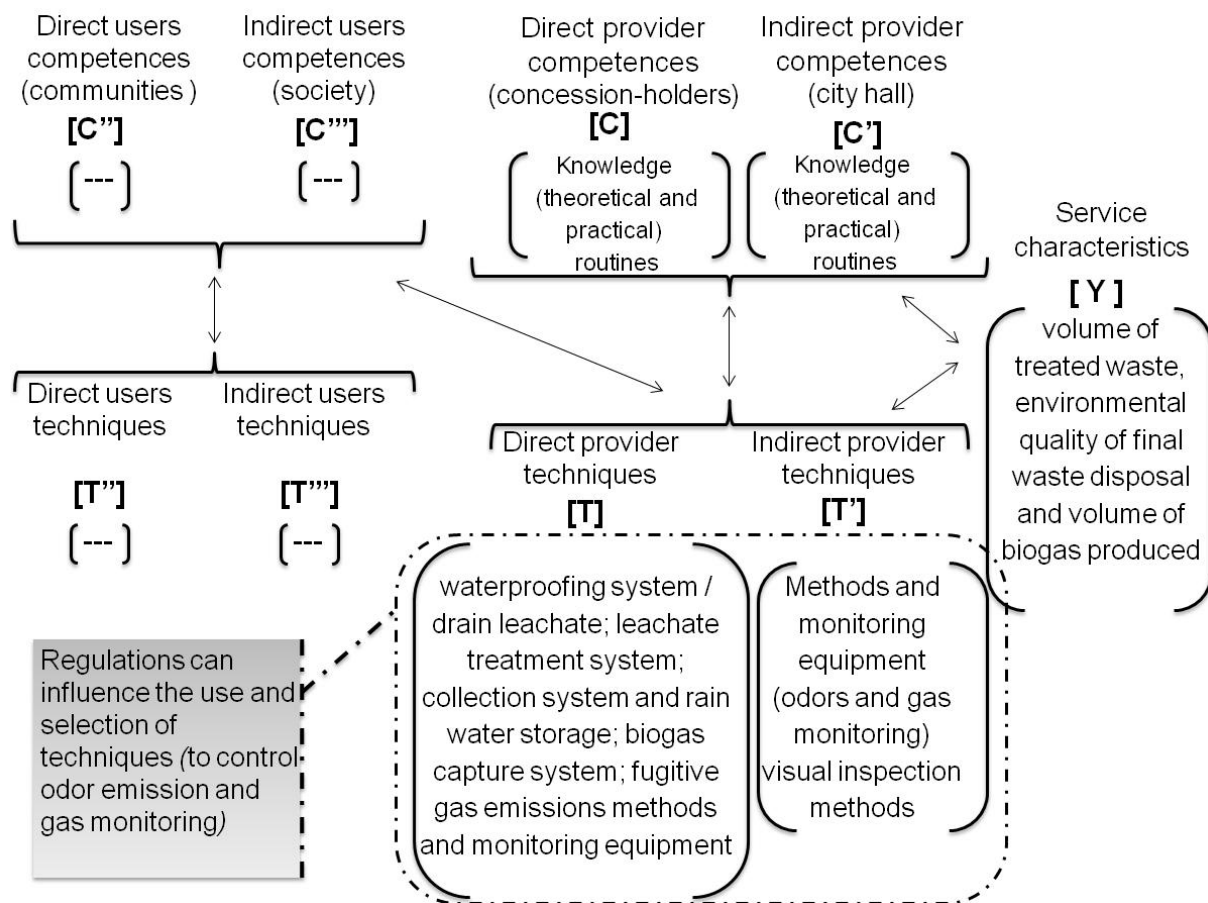


Figure 2: The product as a conjunction of vectors of characteristics adapted to the CDM landfill projects context

Source: The authors.

The service characteristics vector (Y) highlights the key features which justify applying resources to this service. Services related to final waste disposal in the CDM landfills, service characteristics (Y), are: volume of treated waste, environmental quality of final waste disposal and volume of biogas produced. The focus on providers and users techniques (T, T', T'', T''') and competences (C, C', C'', C''') to produce services related to final waste disposal take into account soil, air, surface and groundwater contamination.

With regard to the analyzed context, the appropriateness of emphasizing the role of regulations (particularly focused on odor control and gas monitoring) was observed, given their potential influence on the use and selection of techniques by direct and indirect service providers.

The representation of services in terms of their characteristics is a theoretical approach which enables the move from the conception of product (good or service) towards innovation, based on the changes in service characteristics and considering the different agents influencing service production.

In general, technological and non-technological innovations are identified and focus on the operational efficiency of the landfills' biogas capture systems: the final cover layer in the landfill post-closure phase and the biogas generation prediction model. It became apparent that air quality monitoring linked to odor emission control - considered as a key-point for the communities surrounding the landfills - is a problem, thus exposing the deficiencies of methods, standards and competences in the researched context, that is, odor emission control is a co-benefit which has not yet been achieved.

As previously discussed, in Brazil, the public service of urban solid waste management is mostly performed by private companies. The Government grants concession-holders the right to perform this service. Therefore, based on the theoretical model adopted, municipalities are considered to be indirect service providers, and concession-holders, direct service providers. The communities surrounding the landfills are considered direct service users, and society at large, indirect service users, given the emphasis on the generation of local co-benefits from the CDM landfill projects.

The quality of a good or service is the result of the set of competences held by providers and users (Gallouj; Weinstein, 1997; Windrum; Garcia-Goñi, 2008) including the providers' competences to produce the service (back office competences) and to interact with users (user facing competences). That is, the competences of the actors involved in the "service triangle" in order to establish, produce and deliver the final service.

The direct (T) and indirect (T') service providers' technical characteristics vectors and the direct (T'') and indirect (T''') users' technical characteristic vectors make up a set of techniques used to produce a product. These techniques may be tangible (computers, machinery, equipment, and other infrastructure items) or intangible (mathematical methods, working methods).

In the researched context:

Direct service provider techniques (T) encompass waterproofing system / drain leachate; leachate treatment system; collection and rain water storage systems; biogas capture system; fugitive gas emissions methods and monitoring equipment.

Tangible techniques predominantly relate to landfill maintenance equipment, machinery and materials. In the CDM landfill projects the incorporation of new equipment, particularly in relation to the thermal power plant operation and the final waste cover, is highlighted. Intangible techniques relate to adjusting (tropicalization) the model to provide for potential biogas production.

The aim of gas monitoring is to detect possible gas migration and the risk of explosions. The results of the monitoring analysis enable adjustments and corrections to be made in the landfills' gas drainage systems, eliminating odors and assisting in the efficient and safe handling of gas.

Indirect service provider techniques (T') relate to the supervision of activities carried out by concession-holders. They comprise rainfall recording monitoring methods, checking the performance of surface drainage equipment used, monitoring and piezometric levels readings, physiochemical and microbiological analyses of surface, groundwater and leachate samples in order to check for possible deviations over the monitored period. Methods for monitoring the biogas produced were also incorporated. In terms of equipment, the main instruments used by the indirect service providers to conduct landfill inspections were superficial signs of landslide, water level meters, piezometers and gas manometers. In terms of intangible techniques, visual inspection methods to identify geotechnical problems are highlighted.

The key difference between the direct service providers (utilities) and indirect providers (public sector) techniques relates to the fact that the former are responsible for sample production, development and analysis and the latter, for the supervision/inspection of the procedures performed by the direct providers.

No direct or indirect user techniques - (T') and (T'') - which influence service characteristics were identified.

Competences are incorporated into individuals, a group of individuals or an organization and are the result of activities such as training, experience and interactions. These competences are tacit and not likely to be transferable.

Within the research context:

Direct service provider competences (C) related to knowledge (theoretical and practical) and routines. The theoretical and practical knowledge for adapting and applying biogas estimation models considering the parameters compatibles with the Brazilian panorama are highlighted.

The first step in biogas capture and utilization for power generation includes initial theoretical studies which must take into account parameters, tests and experiments appropriate to each case analyzed (Kaimoto et al, 2006). Therefore, this gives rise to the need to provide more conservative parameters, adapted to the Brazilian biogas production context, considering that the first CDM landfill projects did not meet generation estimates for certified emission reductions (CER) during the first accreditation period.

In order to address this shortfall, new theoretical knowledge was acquired by adapting the model to predict the biogas production potential. Initially, the projects applied the United States Environmental Protection Agency (US EPA) model in order to reduce uncertainty regarding biogas generation throughout the project development phase. Other methodologies were applied by the CDM projects that took part in the second accreditation period.

In relation to the practical knowledge of direct service providers (C), CDM implementation required extensive initial training to guarantee landfill maintenance in accordance with the PDDs during the entire project cycle. Project expertise is required for the gas capture and treatment operation system. Practical competences for biogas capture drainage regulation and operation stand out, as do biogas capture supervision system records.

In general terms, essential practical knowledge required for biogas capture activities in landfills relate to handling systems, equipment and technological resources suitable for biogas capture; inputting information into the systems according to the standards required by the CDM / designated operational entities (DOE) / Environmental Sanitation Technology Company (CETESB); identifying solutions for problems caused by the inappropriate use of systems and work equipment; care in the use of systems and equipment; rapid decision-making relating to operational problems; sharing relevant information; identifying potential operation system errors, equipment and technological resources.

In relation to routines, the Designated Operational Entities (DOE) are the international or national bodies responsible for validating CDM landfill projects. DOEs are involved in the initial phases of project design, validation, registration and also throughout the accreditation period. Project monitoring takes place periodically and the CDM Executive Board is requested to issue CERs with mandatory validation by the DOEs. The validation process may change or introduce new procedures and processes in landfills, affecting routines, processes and operations.

Indirect service providers competences (C') relate to knowledge (theoretical and practical) about the biogas capture system. Subsequent to the implementation of the biogas capture system, the identification of cracks and/or leakage in landfill sites becomes a relevant topic.

Thus, in relation to routines, trained technicians conduct careful visual inspections in order to identify signs of geotechnical problems. If anomalies are perceived, they are recorded and analyzed, instigating appropriate actions, interventions and / or repairs.

No direct or indirect users' competences - (C'') and (C''') – influencing the service characteristics in the final waste disposal of CDM landfill projects have been identified.

In this context, the need to develop regulations to control odor emission and gas monitoring is highlighted. Regulations can influence direct and indirect service providers in terms of their selection and use of techniques.

It is important to note that when the system of capture, drainage and combustion in isolated wells, and the waste cover system perform correctly, in accordance to environmental standards, sulfur dioxide (SO₂) and other gases are eliminated, preventing their release into the atmosphere, thus mitigating a side-effect that particularly afflicts the communities surrounding the landfills.

However, air quality monitoring linked to odor emission control was considered a priority by the communities surrounding the landfills. Thus, the lack of development of techniques and competences by service providers to control odor emissions is a service provision deficiency.

4.2. ServPPIN and the relational aspect in the innovation analysis

Returning to the literature on ServPPIN, in order to analyze innovation within the context studied, five types of interaction are considered: a) between concession-holders and direct users; b) between different concession-holders (private enterprises); c) between public organizations; d) between public organizations and direct users; and e) between public organizations and concession-holders.

a) Interaction between concession-holders and direct users

The use of extremely technical terms in the documents prevents direct users from attending meetings. This situation can be remedied by developing the competences of direct and indirect providers' [(C) and (C')] to produce illustrative/ easily understandable material containing the main points of the project and future actions to be taken with CDM resources.

It is important to note that the 30-day period provided by UNFCCC for stakeholders to submit comments and suggestions to the projects is too short. Direct and indirect providers have the opportunity to develop techniques [(T) and (T')] and competences [(C) and (C')] in order to close the communication gap, seeking new interfaces with users and providing appropriate access to information about CDM projects. For this to take place, direct and indirect providers, and direct users [(C), (C') and (C'')] are required to have competences comprising knowledge / qualifications in understanding and communication, taking into account user needs.

Direct users are unaware of Annex III aspects. Once again, it is important to highlight the difficulties in understanding the content of documents related to the projects due to the technical language and terms used. Therefore, direct and indirect providers, and direct users [(C), (C') and (C'')] need to develop competences in order to establish an effective common language among different agents.

A possible solution would be the development of community newsletters / brochures describing the actions to be taken in the community with project resources. However, in this study, local cooperatives benefiting from CDM resources have not been identified.

b) *Interaction between private concession-holders*

The Bandeirantes landfill is operated by two direct service providers. In this case, the interactions between the private concession-holders can be subdivided into technical report information; changed routines; meetings in the "AS5" landfill area; and the landfill closure plan. Compared to other experiences of landfills managed by a single concession-holder (managing the site and operating the biogas system) which tend to be more successful in terms of tasks and activities performed, in Bandeirantes, a considerable amount of time is spent in disagreements and other bureaucratic issues, because there are two direct service providers operating in the same site.

In both landfill cases studied (Caieiras and Bandeirantes), the development and dissemination of technologies related to project implementation are cited in the PDDs and validation reports. According to the data analyzed, incremental innovation resulting from CDM implementation stands out with regard to the improvement in the biogas system of collection, drainage and combustion in isolated wells, resulting in greater biogas capture efficiency, that is, in a reduction in the amount of fugitive gas from the landfills - a direct service provider technique (T).

In addition, still regarding direct service providers techniques (T), advances have been observed in the model used for establishing parameters to estimate LFG generation adapted to the reality of the landfills. These innovations required the establishment / improvement of direct service providers competences (C) related to the acquisition of theoretical and practical knowledge (to develop and apply methods and technologies) and routines for monitoring landfills.

c) *Interaction between public organizations*

In general, public sector participation in CDM projects is very small, especially in projects developed by the private sector. However, the public sector, as the body responsible for service provision, must ensure that the service is being adequately provided. Thus, the public sector must have a leading role as a regulator, in surveillance, providing support and as a planner.

It has been observed that indirect service providers (C') need to develop relational competences, routines, communication channels and information sharing strategies to interact with other stakeholders, particularly with direct service users. Therefore, further interaction between private-public sectors and joint actions should be implemented seeking to improve and produce co-benefits related to CDM projects.

d) *Interaction between public sector organizations and direct users*

No competences - (C') and (C'') – or techniques - (T') and (T'') – influencing co-benefits generation related to service direct providers and direct users interaction have been identified.

It was observed that the programs, projects and activities to be carried out with carbon credits resources are based on fuzzy and superficial guidelines and deadlines. Thus, it is important to highlight that direct service providers need routines and communication channels (C') to interact with other stakeholders, particularly with direct users.

Interaction deficiencies and a lack of access to data/ information on the part of direct users prevent the landfill from adequately fulfilling local demands. In this way, this study observed the need to develop indirect service providers' competences (C') to monitor whether municipal budget projections are being met, in addition to indirect service providers' techniques (T') related to data access and accountability methods and procedures.

e) *Interaction between public sector organizations and private concession-holders*

Innovations also include building on indirect service providers' techniques (T') in relation to methods for monitoring and investigating the activities performed by direct service providers through the visual inspection of geotechnical problems perceived.

Furthermore, it is worth noting the importance for indirect service provider engineers and technical staff supervising the landfills of knowledge (C') related to handling systems, equipment and technological resources, as well as knowledge related to understanding the biogas capture process.

According to the direct service providers, indirect service providers need to develop competences (C') to promote innovation, in particular with regard to establishing effective routines and communication channels. Currently, communication occurs through the submission of environmental quality monitoring reports and on-site periodic inspections of indirect service providers.

Another point to highlight relates to regulations and standardized methods for odors and gas monitoring and sampling. The periodic inspections are performed on a case-by-case basis, according to the criteria set out by the inspector visiting the landfill. Therefore, techniques (T') must be developed in order to define procedures to evaluate the adverse impacts produced by landfills activities.

5. Conclusion

The aim of co-benefit indicators is to contribute to the analysis of the innovation dynamics in order to clarify service changes and expose deficiencies in terms of the amendments demanded by stakeholders so as to fulfil the requirements related to the promotion of CDM project co-benefits.

By using the characteristics-based model and the ServPPIN concept, the main goal of this study was to evaluate to what extent the projects have fostered innovation in landfills whilst promoting social and environmental co-benefits and the participation of stakeholders.

The focus on competences and techniques related to services produced is based on the analysis of innovation in order to contribute to a better understanding - and discussion - of the opportunities and limitations of CDMs in the waste sector.

The focus on the interaction between public and private sectors and users is based on the ServPPIN theoretical approach, highlighting the importance of relational aspects.

Finally, in terms of the implementation of CDM projects, it is suggested that the development of techniques, competences, and stakeholder interaction should be fostered so as to contribute towards the improvement of solid waste public services in the context researched, in particular, during the last stage of service provision: the final disposal in landfills.

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A labour process approach to derived typologies for service innovations for Mexican KIBS

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Abstract

An innovation typology is developed based on the historical technology labor process changes taking into account services and goods at each stage. This dynamic approach goes together with productivity which is a function of the speed of capital flow depending on the economic cycle. The different kinds of services have an impact on innovation according to their function in the capital cycle: production, circulation or both. This top-bottom analysis is complemented with the application of these theories to 35 knowledge intensive business services, KIBS, in Mexico (mainly software & ICT) contrasting their output in innovations and market positioning with their inputs in investment in R & D, workers' qualifications, components used in innovations and external knowledge links.

Index Terms *KIBS, software, typology, labour process, capital cycle, Mexico.*

1. Introduction

In a context of economic crisis Schumpeter's innovation and entrepreneur concepts are related to the swings of "creative -destruction"². The long term economic waves of prosperity-recession, and depression- improvement result in the development of service economies that is, economies with half or more jobs in services (Schettkat & Yocarini, 2006), (Fuchs, 1968) (Evangelista & Savona, 2003). In this context, that is the evolution towards knowledge societies, we need to follow up the emergence of Technology goods and Knowledge intensive business service, KIBS, and the decline of different industries over time³.

Research on innovation has been oriented towards measurement and the positioning of firms, regions and countries which has been very important for comparative studies⁴. But this development has put aside Schumpeter's theoretical approach of innovation (Drejer, 2004). So, the purpose of this paper is to point out the importance of

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² The process of creative-destruction can be analysed at firm or industry level, as a process of industrial change and renewal which is fundamental for economic growth and development (Schumpeter, 1976).

³ „the innovation process, and service activity within that process, suggesting that service-centered perspectives relating to consumption and technological innovation will become more central to the competitive advantage of firms and nations“ (Howells & Teller, 2004).

⁴ The OECD has worked for 50 years on the development of science, technology and innovation indicators. Today, innovation raises measurement challenges that are either new or require urgent attention (OECD, 2010).

going back to consider some abandoned theories such as the different kinds of labour processes and the functional spheres of the capital flow for both goods and service innovations.

So, innovations involving new products, processes, markets, resources and organizations are key concepts for theoretical and empirical research.

2. Literature Review

The evolution of the economic analysis of services and particularly of service innovation has been characterized in the following approaches: assimilation, demarcation and synthesis (**Coombs & Miles, 2000**). In the assimilation approach, service innovation is regarded as similar to innovation in manufacturing, while in the demarcation approach as services are different, they are considered to need a specific method. Then, anticipating a synthesis, the interrelations between goods and service innovations (**Omachonu & Einspruch, 2014**) involve a combination of new and old theories and concepts (**Djellal & Gallouj, 2013**).

Comparing service innovation with goods innovation, there is a 'reverse innovation cycle' which differs from the classical manufacturing one, as in the consumer services industries innovation begins with the efficiency of delivering the service, followed by process innovation that develops service quality, and finally, service product innovation achieved through new kinds of services (Barras, 1986).

In order to classify service innovation four characteristics are proposed (den Hertog, 2000): service concept, client interface, service delivery, and technology which are related to personal, organizational, marketing and competing capabilities. Another approach involves considering which factor is undergoing most change: physical (goods), information, Knowledge-based or people, or stressing intra-services differences in terms of the patterns of technologies used, relevant market characteristics and the technical skills required (Miles, 2008).

However the labour process and the capital cycle flow have not been considered in the literature to explain service innovation.

3. Methodology

We used a deductive, top-down approach which involves: 1) considering historical changes in the labor process separating goods and services at each stage; 2) classifying services considering: a) whether they are part of the production or circulation processes, as in the case of financing and marketing; and, b) whether the client is a consumer or producer or both: service co-terminality, and co-production or client interaction (Kvålshaugen, et al., 2008) – thus, they could be part of consumption or/and production⁵.

⁵ Co-terminality, when "service product, process, and service consumption take place at the same time and place". (Miles, 2008). Co-production is when "the production of services by KIBS is often the result of a joint effort of service provider and client" (den Hertog, 2000).

First, the evolution of the labor process is classified into both services and goods used in production. The point of departure is the artisan process which needs hand instruments and knowledge related to specific skills. Then follows the industrial revolution that has two phases: one, manufacturing based on the division of labor between workers and two, the introduction of machinery using steam energy. So, machine-tools demand different services from maintenance on up to specialized skills, organizational services and energy require prospection and distribution services (Table 1).

As the labor process tends towards automation, there is demand for supervision, control, information and computing services, as well as software and design. Next, science incorporates intellectual and creative knowledge, R&D, information systems, and networks services into production.

Besides labor, machinery, energy, information and commodities, the consumer who also serves as co-producer is added, generating a kind of co-producer and self service⁶ (Table 1).

Secondly, services are classified accordingly to their function in the process of the Circulation of Capital. So services could be inputs in production (e.g. design, business consulting), or they are part of the circulation process, mainly services of marketing and finance. If the product is a Service, S, it is delivered to the client -so it does not become a commodity as in the case of Goods; a different kind are the tradable services⁷. Also, some services are finished by the client, adding use value to it (eg. a transaction made in an ATM).

The two approaches are applied together, considering that the labor processes are all present as heterogeneity can be observed, meaning that the hand craft and manufacturing are present along with automated processes.

An inductive, bottom-up approach was then used starting with 35 Mexican KIBS applying this general typology and a specific indicator related to innovation and diffusion (INDICO⁸), as well as the four-dimensional model of service innovation based on 1) service concept, 2) client interface, 3) service delivery, and 4) technology, thus establishing different patterns in the relationship between the supplier, service firm and client (den Hertog, 2000).

A correlation analysis is made with the data of the 35 firm in order to test the hypothesis of differences in the causes of innovativeness and service innovation patterns in function of: labor process, position in the circulation of capital, firm size (number of workers), R&D investment, client participation and knowledge-intensive service.

⁶ [.,]by exploiting new digital technologies, firms like Apple, Lending Club, and AirBnB have made customer co-creation of value central to their business models and in doing so now rank among the world's most innovative and valuable firms" (Barry, et al., 2015).

⁷ Tradable services are: Education, Health, FIRE(Finance, Insurance, Real Estate), Architectural and Engineering services, ICT and New Media, Producer Services (Business consulting, Marketing, Management, Accounting, Legal, etc.), Transportation and Logistics, Government services, Cultural services (Goldberg, 2009).

⁸ The INDICO Index is explained in (Corona, 2015).

4. Results

A way to generate a typology is proposed based on the separation of the labor processes into goods and services, and the kind of economic activity in relation to the capital cycle, providing a new explanation to the descriptive variables presented in the literature, considering the heterogeneity of services and innovations.

An exploratory study of 35 innovative firms is made through direct interviews, along 2013 and 2014, based on a questionnaire⁹.

First an index of the firm innovativeness, called INDICO (Innovation, Diffusion and Competitiveness), has been proposed base on its capabilities and results.

Second, after different correlations to explain the firms' innovativeness, the following linear regression accounts 60% of its dispersion:

$$IN = 1.97 + 1.81CI + 0.38KC + 3.35 k; \quad R^2 = 0.60 \quad (\text{eq. 1})$$

t, (3.36) (2.27) (1.10) (6.28)

Where,

IN, Indico Index (0-10) which expresses the firm's innovativeness (note 6).

CI, client participation in the innovation (0-1).

KC, capital cycle phase: production (2), market (1) and finance (0).

k, proxy variable of the knowledge intensity of firms' innovations: Software design and engineering.

t, t-Student.

The knowledge intensity of firms is used instead of the labor process index which was rejected statistically. This could be because there are different kinds of innovations depending on the level of labor, from artisan up to automated production and the scientific process. So, a more detailed analysis would be necessary.

Therefore, considering that most of the firms selected are related with software either because they sell it or use it, software and design and engineering knowledge content is applied as a proxy variable of knowledge intensity (k). For this variable the regression coefficient is the largest, explaining the marginal growth of innovation, 3.35. In second place comes client-producer participation with a coefficient of 1.81, which is only affirmative in 20% of the firms. So, a policy for promoting client inclusion for innovation could benefit the other 80% of the firms selected.

Unexpectedly, lifecycle (firm's age), labor process, R&D expending and firm's size (number of workers), show a low correlation with the innovation index, as these variables have been statistical rejected (t-student).

⁹ Of the 35 firms are 4 producing goods and 31 services. 24 are in Mexico, 10 in Girona, Spain and 1 in Costa Rica. The main business activities are software (18), informatics (5), marketing (3) and others (tourism, health, consulting and food services).

Finally, according to the position of the firm in the phases of capital, innovation increases 0.38 if the firm is in marketing or twice this value if it is in production; and void if it is in the financial phase.

4.1 Discussion

The labor process as an explanation variable of service innovation has not been statistically proved at firm level. So, problems for future research include: 1) differentiating between varying types of innovation depending on the kind of labor process, and 2) applying our methodology to in a larger sample of firms. Nevertheless, there is a difference in the evolution of the labor process due to the coexistence inside the firm and between firms of artisan, manufacturing, automation and scientific processes. This notable heterogeneity has real impacts of innovation opportunities based on the ICT and could be a possible explanation for the importance of software and design and engineering in the firms' innovativeness (eq.1).

In contrast, the position in the capital cycle has the lowest impact on service innovation (0.38, eq1). Accepting the analysis of the capital cycle, future research, it will need to look into its phases in more detail, perhaps dividing them or establishing other complementary functions¹⁰.

Client participation on innovation it is at present widely studied. Co-terminality of services (Miles, 2008), based on the viewpoint of "use value", needs to be complemented with the "potential value" of client participation which is implicitly transferred to diminishing firm's production costs (Fig1). Thus, the consumer-as producer can increase innovation in 1.81 times. Hence, another line of research is to develop a typology of client participation in production, both as a value-user and in value-transfer.

Conclusions

This paper addresses the following approaches to explain the variety of services:

- 1) Services and goods are both part of the evolution of the labor processes, from artisan, manufacturing, automation up to scientific processes (Table 1). As these labor processes coexist in a given period of time, they generate a production heterogeneity which is wider in services.
- 2) Mainly through services the Consumer- (as) producer is added to the traditional production components, Labor, Machinery, Energy, Information, Science (knowledge). The client's participation as co-producer is impacting the production of services as well as on innovations.

¹⁰ Dividing the capital cycle phase, KCb into direct participation (2 for production, 1 for distribution, 0 for financing) and support activities (1; 0.5; 0, respectively) the resulting correlation is:

$$IN = 1.94 + 1.17CI + 0.56KCb + 3.39 k; \quad R^2 = 0.62. \quad (eq2)$$

$$t, \quad (4.41) \quad (1.50) \quad (1.69) \quad (6.23)$$

- 3) Service innovations are influenced by the position of the firm in the phases of capital cycle.

The regression analysis of 35 firms shows that software and design and engineering knowledge has the largest marginal impact growth on innovation, 3.35. In second place comes the client-producer participation with a coefficient of 1.81; and thirdly, the position of the firm in the phases of capital, 0.38. (equation 1).

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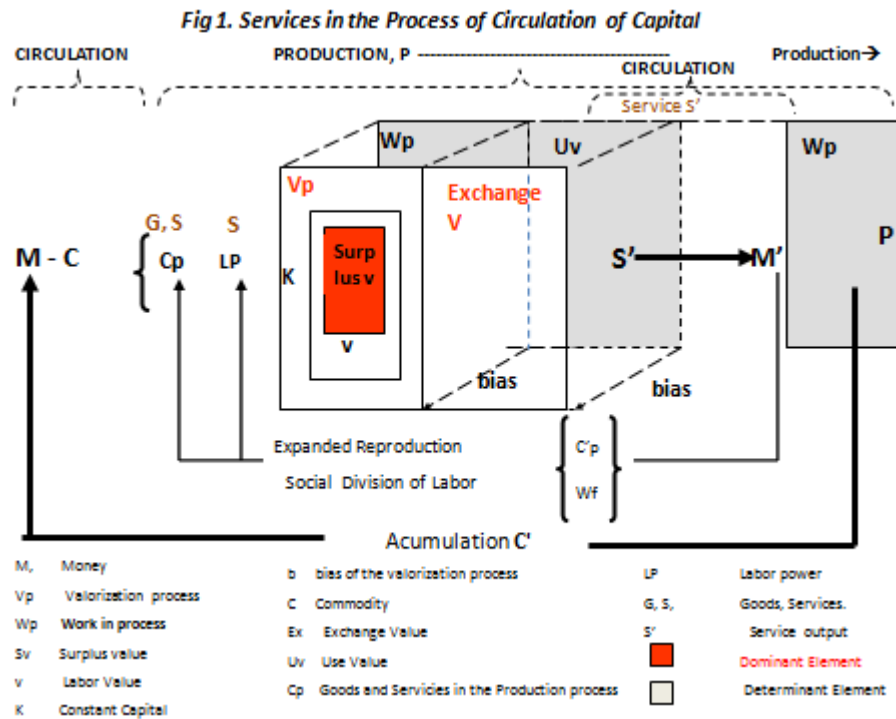
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LABOUR PROCESS->	ARTISAN PROCESS		MANUFACTURING		MACHINERY SYSTEM		AUTOMATION		SCIENTIFIC PROCESS	
COMPONENTS	Goods	Services	Goods		Goods	Services	Goods	Services	Goods	Services
LABOR	Hand Tools	Skills, Capabilities, Knowledge, Physical work		Division of Labour		Labor: Routine tasks. subordination to the machine. Work specialization		Supervising & Maintenance	Training equipment	Researcher. Intellectual collective work. Development of creative abilities
MACHINERY			Machine Tools powered by human muscle	Maintenance	Machine Tools powered electrically, hydraulically or via line ,shaft	Maintenance	Computer Numerical Control (CNC)	Specialized software	Laboratories: Physics, chemical, biology, nanotechnology	R&D
ENERGY					Electric Motor		Robotics. Automation		Technologies for renewable resources, TER	Design. Prototypes
					Coal Oil Gas.	Prospecting	New energy sources: nuclear, solar, biological	Prospecting	Distributed Energy Resources (DER)	PPP electricity services
INFORMATION					.Electricity	Electricity distribution	Power generation, transmission systems, and distribution systems	control system	Cloud Storage	Integration of information: Images, data & sounds
RAW MATERIAL-Science (knowledge)							ICT Information and Communications Technology	Computer systems and information processing	Science instruments: telescope, microscope, particles acceleration	Scientific networks
										INDUSTRIAL REVOLUTION
										INFORMATION REVOLUTION
										SCIENTIFIC & TECHNOLOGICAL REVOLUTION

Table 1
Role of services in labor process & consumption

CONSUMER- (as)PRODUCER		Do it yourself (DIY)	Self service machines	Co-terminal- ity or not (Miles, 2008)	Mass Industrial Production	Standardized Service	Flexible automation	Automated Teller Machine	Customer involvement in service development. Use of new methods / Customers as resources / Utilization of user innovations	KNOWLEDGE SOCIETY
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Source: Author's elaboration.

H: ICT's role in service development (A)

H1: ICT based service encounters and innovation

Chair: Flemming Sørensen

Co-production of the Service Recovery – Embodiment Perspectives for the Innovation from the ICT-centric Service Encounter

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In this paper we apply Dourish' (2001) conceptual framework of embodied interaction on a ICT-centric service encounter, namely the use of the online self-service system for reporting of tax and tax reduction claims offered by the Danish tax authority. An expected short and straight-forward service encounter developed in this case into to a two weeks long service journey involving several human and computer actors as the reason for the service failure (represented by a blank pop-up window instead of the expected online form) could not be found. The case, which is seen as paradigmatic is used to test the potential of using Dourish' frame for a better understanding of the co-production of a service recovery. Bringing together service research, HCI and design research, this paper is an attempt to discuss whether the embodied interaction framework is productive for the analysis of the interaction and the service recovery process, thereby informing the innovation and design of ICT-centric service encounters.

1. Introduction

Typically, when an ICT-based service encounter develops differently and less easy than anticipated by the customer / user, one would talk about “low user-friendliness” or “bad design of the system”. Professional usability experts can conduct tests and examinations to single out the problematic elements in the interactive system. This approach is often normative in the sense that ideally all usability problems should be eliminated. Where this approach appears straightforward when simple systems and simple interactions are in question, the normative usability approach becomes less operational when we look at complex service journeys with both human and ICT-based touch points. This is particularly the case when the service journey develops unexpected and becomes much longer due to a non-functioning interaction between the different elements in system, including human service workers and the user. Finding the reason or reasons for the service failure might be futile in a complex service journey. Widening the scope of understanding from a narrow usability-oriented explanation we can speak of a service failure in an ICT-based service that calls for a service recovery.

The starting point for this paper was an unexpected long service journey I had with the Danish tax authorities. The service encounter evolved into search for the cause of a fatal error: a blank pop-up window instead of an online form for reporting tax reduction claims. The service journey involved a web-based self-service, a family member, two browsers, two plug-in browser extensions (3rd party software), a login- / authentication service, three service helpers in a phone-based hotline. The aim of the

paper is however not to conduct a usability test or evaluate the specific service recovery process, but to use this case as a starting point for a discussion of the potentials in applying Dourish' (2001) embodied interaction framework on the analysis of the interaction between the different actors / entities in the service encounter and service recovery process. The question is whether an embodiment-informed approach, can provide a better description of the interaction between the different human and technical elements in a ICT-based service encounter than the traditional face-to-face oriented service encounter and service recovery literature. We question thus whether the different conditions for ICT-based service encounter produce a need for a different analytical approach. The aim is to provide new insights into and an understanding of the complex ICT-based service encounter, e.g. one where service failure and service recovery plays a central role.

With this paper we thus aim to examine and discuss whether the embodiment approach to the analysis and design of ICT products as proposed by Paul Dourish (2001) is productive for the analysis of ICT-based service encounters. Dourish' main claim is that our understanding of the use of IT products and services should acknowledge that the use is embedded in a physical (tangible) world as well as in a social world. Derived from the embodiment-informed analysis of a specific ICT-based service encounter, which revolves around the co-creation of the service recovery, we discuss whether the embodiment approach offers new ways to innovate from the ICT-centric service encounter, particularly those which needs service recovery. The question however how far Dourish' embodiment framework can be extended on very cognitively dominated service encounters, such as tax reporting or the search for solutions of service failures in ICT-systems.

1.1. Research questions

The questions we ask above lead to the following research questions:

- What is the relation between Dourish' concept of embodiment, and service failure, problem search and service recovery in the ICT-based service encounter?
- Can Dourish' embodied interaction framework contribute to the understanding of the possibilities for innovation in ICT-based service encounters?

1.2. Expected results

Through the detailed analysis of a specific ICT-based service encounter through the concept of embodied interaction the interplay between the different human and technical elements in service encounters may be described in a more comprehensive and general way than traditional usability methods or service recovery literature allow. The embodied interaction framework helps identifying the particular conditions for the ICT-centric service encounter, which are different from the face-to-face service encounter. This can contribute to the understanding of complex ICT-based service encounters, and provide perspective for innovation from these encounters.

2. Theoretical background

2.1. Embodied interaction

Paul Dourish' (2001) embodiment approach to user-interaction with computers is rooted in the historical development of computing from large experimental main-frame computers that were programmed manually to compute well-defined mathematical problems, to today's ubiquitous use of computing in almost all aspects of life. His point is that where the starting point for computing was highly cognitive and abstract, today's use of computing is embedded in a social and tangible world. We, as normal users, do not approach computers as abstract calculators, but as representations of real-world phenomena. His book "Where the Action Is – The Foundations of Embodied Interaction" (2001) could thus be described as an examination of the tension between the strict logic of computing inside the machines and the rich and complex diversity of the real world situations in which they are being used as tools. Dourish is thus interested in how meaning is created by users in a specific context, and subsequently in how the principles for the design of social and tangible computing should be phrased.

Dourish' book (ibid.) is written before the commercial break-through of touch-screens and social network services, which could be described as examples of respectively tangible and social computing. The book's more general approach to embodiment makes however its analytical framework relevant also today. As Dourish (2001, 100) observes, the idea of embodiment is not new. His account is based on thorough studies and discussions of "The Phenomenological Backdrop" (2001, 103-116). Space does not allow an equally detailed introduction to the phenomenological thinkers Husserl, Heidegger, Schutz and Merleau-Ponty. Instead we build on Dourish's formulation of embodiment in a computing context.

2.1.1. Embodiment as Tangibility

Dourish's starting point for the discussion of embodiment is the common sense notion that smooth interaction appears to be based on some kind of "familiarity" (ibid. 99). To develop the "familiarity" concept, he introduces two elements: tangibility and socialibility. Together they form the embodiment. He allocates two full book chapters to discuss each of the aspects of computing. Our presentation of his thoughts must necessarily be shorter. A starting definition sounds:

"Embodiment is the common way in which we encounter physical and social reality in the everyday world. Embodied phenomena are the ones that we encounter directly rather than abstractly" (Dourish, 2001, 100)

The embodiment is however not reserved for physical objects alone. He extends the embodiment concept to encompass also "other phenomena that unfold directly in the world; conversations, mutually engaged actions" leading to a definition of embodied phenomena as "those that by their very nature occur in real time and real space" (ibid. 101). The interesting point here is what he understands as 'real' and where reality stops and becomes abstract.

Dourish is not perfectly clear about this, but he observes an interesting property of computation: Computers have a dual nature since they at the same time are physical

devices powered by electric power, as well as medium for information (ibid. 140-142). The binary signals, which they contain and process are at the same time information that represents real world embodied objects. Computers are at the same time abstractions and implementations that make the abstractions real. However, as Dourish observes, computers are also themselves objects, e.g. with specific properties in memory and processing speed. The embodied computing relies thus on a tight coupling between the abstract data, the representation of it and the real tangible world.

2.1.2. Embodiment as Sociability

The other component in embodiment is the social character of the interaction: He argues that “[e]mbodiment denotes a form of participative status” (ibid. 101). Inspired, among other sources, by the research in computer-supported collaborative work (CSCW), Dourish (ibid. 186) stresses that the use of computers often takes place in a “community of practice” (cf.: Lave and Wenger 1991; Wenger 1998). This concept indicates that learning often takes place as “legitimate peripheral participation” where the learner in a kind of apprenticeship is peripherally associated with a community of practice. This community of practice is held together by the shared histories, identities and practises. For Dourish, the technology plays an active role in these communities of practice: “the technology does not simply afford certain sorts of actions, but (...) [it] also reflects particular sets of assumptions, conventions, and practices within a community” (ibid. 186). There is thus as mutual interaction between the community of practice and the tools being used in this community.

2.1.3. Computing as a medium in itself

In the discussion of the coupling between the real world and its representation in the “parallel world” of computing, Dourish first of all makes us observe that computing has a dual nature of being both symbolic representation but also an actual physical phenomenon taking place as electrical currents in circuits. The computing can thus be seen as a medium in itself, a medium through which meaning is being modulated in the same way as “as signals modulate media” since “technology is embedded in a set of practices” (ibid. 166). It is however the users, not designers of the systems that create and communicate meaning – the mental coupling between real-world phenomena and their representation in the IT-systems: “Coupling is a matter for users, not for developers” (ibid. 173). He extends this argument to claim that embodied technologies participate in the world they represent (ibid. 177). The question, which is not discussed by Dourish, but which is central to our case, is: How well does computing modulate real world practices? Is tangible and social knowledge being lost in the computing if it cannot be modulated?

2.2. Embodiment in ICT-based service encounter

In its physical sense tactility is a central concept in a traditional face-to-face service encounter. Some (e.g. Henten, 2012) would even define a service through the simultaneous production and consumption, as inseparability of the service customer and the service render. Others would conversely mention the intangible nature of the service – a property that by definition contradicts the idea of embodiment, at least if embodiment is understood narrowly as a physical object.

Shostack (1982, 51-52) introduces the term “service evidence” which could be described as an embodiment of the service encounter. There are two types: Peripheral service evidence plays only a minor role in the service encounter, e.g. a confirmation of the service, such as an airline ticket. It has no independent value. The essential service evidence, Shostack argues, cannot be possessed by the customer, but is e.g. used to produce the service: “it may be so dominant in its impact on service purchase and use that it must be considered virtually an element in its own right” (ibid. 52). An example would be the physical aircraft that transports the passenger.

When we look at ICT-based service encounters, this distinction is challenged. The service encounter has no physical manifestation neither as peripheral or essential service evidence. The service rendering on the interface is just made by pixels, LCD dots powered by electricity. Nevertheless, service customer may still perceive the service evidence. Besides the physical properties of the end-user equipment (e.g. PC-screen, smart phone or tablet) which physically renders the service, there are also other types of service evidence, e.g. the confirmation email, the access code, the user name, the ‘confirm’ dialogue box, the error message, etc. Although intangible in nature, these fulfil the role as service evidence in the ICT-based service encounter.

2.3. Innovations from ICT-based service encounter

This paper attempts to apply the analytical framework of embodied interaction on ICT-service encounters to look for new approaches for conceptualising innovation in and from these encounters. The research in service encounters, and particular on innovation from ICT-based service encounters provides thus the other base for this paper.

The field of service research, including service encounters, is broad and well established, as well as research on e-services and service encounters in these. One discussion in this field revolves around the nature of ICT-services: In some aspects they appear to like goods, in other aspects they appear to have service properties (Sørensen & Henten, 2014). Lusch & Vargo (2006) introduce however in their discussion of the properties of goods and services, the idea that one can talk about either about a goods-dominant logic or a service-dominant logic. The latter is however increasingly dominating also in the traditional goods industries: Goods are also being marketed and sold as services.

If we look more specifically on research on innovation from service encounter, a recent research project (ICE – Innovation in the Customer Encounter) has contributed with a new empirically informed understanding of the field. Sundbo, Sundbo & Henten (2015) examines empirically the factors that influence the innovativeness of service encounters. Seven propositions, hereof two which is ICT-related, are tested in qualitative field-experiments in nine service organizations. The ICT-based service encounter is not the particular focus for the researchers. Instead, it is examined whether “[i]t is particular conducive to idea creation if the customers have the opportunity for face-to-face communication besides the ICT-network communication (e.g. via hotlines)” (proposition 5, ibid. 262) or whether the “[a]nalysis of the ICT-encounter basis (e.g. website) can produce knowledge about which factors in the site trigger the customers to enter an interaction process and provide good ideas for innovation. The

more interactive an experimental the site are, the more it can be assumed that the consumers react by presenting new ideas” (proposition 7, *ibid.* 262).

In relation to proposition 5, one field experiment included customer interviews combined with innovation seminars, Facebook communication and GPS tracking. This experiment did not produce particularly much innovation from service encounter. Another field experiment that used Facebook and Youtube showed that innovation was possible without face-to-face encounters. In relation to proposition 7 two field experiments showed that the indirect observation of users without their direct involvement do produce innovations. Two other field experiments showed mixed but positive experiences with direct ICT-mediated interaction with customers e.g. via mail and Facebook.

The question whether the conditions for and the character of innovation from the ICT-based service encounter are different is however less researched. Drawing on the media richness, innovation and service encounter research literature Henten (2012) offers a theoretically informed analytical ‘service approach’ framework of categories of services to analyse the dynamics of innovations from ICT-based service encounters. Sørensen and Henten (2014) look at Co-creation of Innovations in ICT-Based Service Encounters by including research from Human Computer Interaction (HCI), user centred design and interaction design traditions. The implications of the particular characteristics of the communication between customers and service providers in ICT-based service encounter are discussed in relation to innovation: Which roles do the lower media richness and the rigidity of interfaces and interaction (cf.: Harris & Henderson, 1999) play in ICT-based service encounter compared to the face-to-face service encounter? Is innovation impeded or improved? The hypothesis (*ibid.* 70), now open for empirical testing, is that incremental innovations are easier to communicate in the ICT-based service encounter than radical innovations, and thus that the incremental type would dominate in the innovation from the ICT-based service encounter.

2.4. ICT-based or ICT-centric

Another outcome of the Sørensen and Henten (2014) article was the observation that much research of ICT-based service encounters appears to take the vantage point of traditional face-to-face service encounters when looking at ICT service encounters. This idea is developed further by Sørensen & Skouby (2015). The technology is often seen as an element inserted into or added the face-to-face encounter (cf. Bitner, Brown & Meuter, 2000; Froehle & Roth, 2004). This implies that the particular properties of ICT as material for design (cf. Löwgren & Stolterman, 2004) of service encounters may not be acknowledged when ICT-based service encounters are conceived. This has again implications for the potential for innovation from the ICT-service encounter, as we can see the one cannot expect the same type of innovation from this encounter as from the face-to-face encounter. If innovation potential in the ICT-based service encounter should be utilised, it is required that the particular properties of the ‘design material’ ICT is understood.

This shift of vantage point invites to view the entities “customer”, “service provider” and “ICT” as three entities in their own independent right, however with mutual relationships: In the same way as the customer has a relationship with the service provider (as institution, company or organisation), there are also relationships between

the customer (user) and the ICT, as well as between the service provider and the ICT. The claim in (Sørensen & Skouby, 2015) is that in both cases do the ICT contribute to shaping the service encounter. The ICT is not a neutral tool.

To reflect this we use in this paper the term “ICT-centric”, not the term “ICT-based” (see e.g. Sørensen & Henten, 2014; Henten 2012). “ICT-centric” indicates that rule-based logic in ICT shapes the service encounter, where as “ICT-based” mere point at the use of ICT in the service encounter (cf. Froehle & Roth, 2004) or is “infused” into it (cf.: Bitner, Brown & Meuter, 2000). We aim for the discussion of how ICT changes the service encounter, how ICT sets the conditions for the service journey. This perspective enables us to understand the problems that occur during the service journey not just as simple usability problems, as deviations from the planned and expected path for the service encounter, but also as productive information about the nature of ICT.

There is conceptual link between the idea of service blueprints (Shostack, 1982) and ICT services, as computer systems are constructed of rules (computer code) that require a very high degree of regularity, which again reflects the ideal bureaucratic organisation, cf. Harris & Henderson (1999). Zysman, Feldman, Kushida et al. (2013, 99) observe: “When activities are formalised and codified, they become computable. Processes with clearly defined rules for their execution can be unbundled, recombined, and automated. The codification of service activities allows the rapid replication, analysis, reconfiguration, customization and creation of new services”. The authors’ view of this “algorithmic revolution” of services appears to be primarily economical. The quality or customer perception of the encounter is not in their focus.

One central question of “the algorithmic revolution”, which is not discussed by Zysman et al. (2013), is the degree to which actual service encounters follow specific patterns or rules. This question is also raised by Harris & Henderson (1999). They maintain there is a big gap between the ideal bureaucratic workflow and actual workflow (ibid, 90). Bureaucratic praxis do thus accommodate “the particularities” of each case by fitting it to the rules, changing the interpretation of the rules, which subsequently may lead to changes in the rules. This pragmatic flexibility also makes organisations more efficient: “Since enforcing obedience to the norms is costly, those who maintain the integrity of an organization must be sensitive to dissent and must make pragmatic tradeoffs to keep the organization viable” (ibid. 90). The problem Harris and Henderson point at is that IT systems seldom have this flexibility or any contextual or situational awareness. IT-systems typically reflect an idealised image of a bureaucratic organization where no particularities exist. But as we will see in the following empirical material, some service encounters are so complex and particular that they do not offer themselves for automation. Conversely, as we will see, the automation itself produces a longer, more complex and less satisfying service encounter.

2.5. Co-production of the service recovery

The marketing literature on co-production and co-creation of value in services is extensive. Vargo & Lusch (2006) assert in their definition of the characteristics of the “service-dominant logic” that the “customer is always a co-creator of value”. The focus is thus often on the managerial and economical benefits for companies. The classic example of co-production could be customers’ self-service in supermarkets. An exception is Bendapudi & Leone (2003) scenario-based empirical studies of the

“Psychological Implications of Customer Participation in Co-Production”. In the following we will however focus specifically on the much smaller literature on co-creation in relation to the service recovery.

Dong, Evans and Zou (2008) look at what happens when a co-created service fails. Service failure is inevitable in the service industry. The company's reaction on the service failure has however big implications for the customer's perception of the company. Potentially it could either reinforce customer bonds or convert a small and annoying incident to a very negative position. Dong, Evans and Zou (2008) examine through a laboratory experiment where 200+ undergraduate students were confronted with a service failure either in the set of an Internet connection or in the registration of courses. Unfortunately, the authors do not examine the detailed interaction during the service failure or the students' possibilities to co-create the service recovery, e.g. by reporting an error or helping each other, since the test persons only evaluate a short written scenario that describe a specific but hypothetical situation and not a real-world service recovery journey using a e.g. a ICT service. The usefulness for the understanding of the service recovery in ICT-centric service encounters is thus little, particularly regarding the implications for design. It is questionable if a laboratory experiment evaluated with statistics can produce the necessary operational insights into the customer participation in an ICT-based service recovery that are relevant for the design of ICT services.

Roggeveen, Tsiros & Grewal (2012) present like the above study a statistically informed paper with laboratory experiments where students were asked to imagine themselves in scenarios related to a delayed airplane. The details about the service failure (delay) and recovery (economical compensation) were different for the individual students. Students were subsequently asked evaluate different statements on a Likert scale indicating their satisfaction and willingness to co-create the service recovery. The co-creation of the service recovery could e.g. be to search for a new flight. For our research question, the problem remains the same as with the paper by Dong, Evans and Zou (2008): It predicts the statistical likelihood for the customer participation, but methodologically the scenario-based approach does not produce much knowledge of how a real-world service failure and service recovery eventually would be co-created, or how the service design (hereunder interaction design) could anticipate the co-creation of the service recovery.

Methodologically for the study of particularly ICT-centric service encounters it could be interesting to use other methods than scenario-based, since this only operates on the customer's cognitive level and only look at hypothetical situations which is open for the test-person's interpretation. If customer-participation in service recoveries were studied as a sequential process extended in time, capturing both the customer's considerations and reflections, as well as the detailed interaction with the system as well as the human service staff, a more fine-grained and thus more operational understanding of the potentials and risks in the customer participation in the service recovery could be achieved. The research should obviously extend beyond the technical problem finding, and also include customer satisfaction and willingness to future co-creation.

3. Method

This paper is based on the detailed recording and description of a specific ICT-centric service encounter with the online self-service interface for reporting of tax and tax reduction. After an initial analysis of causes and effects in the service encounter and its service recovery, Paul Dourish' (2001) framework of embodied interaction is applied to identify knowledge that extends beyond the single case, but which could be relevant for the design of ICT-centric service encounters.

The analysis presented in this paper is based on a single case. Obviously, this is a weakness if one wants to present general claims or proofs. The case concerns a specific service encounter with one relatively long service journey. It can be argued that many other service encounters in the same self-service system (Skat.dk) are possible. At a few nodes in this service journey, the journey could have developed very differently if other options in the interface had been chosen or if the reason for the problem had been discovered earlier. The aim is however not a general usability-centred criticism of Skat's self-service system, but to use the case paradigmatically "[t]o develop a metaphor or establish a school for the domain that the case concerns" (Flyvbjerg, 2006, 203). It is thus very possible that other case studies of Skat.dk could contradict the analysis presented here. Instead of engaging in a discussion of the most representative case or the most typical usability- or service design problems, we here want to examine a more general phenomenon, namely interplay between a user, a system and a use context, as it looks like through the analytical approach of 'embodiment' as suggested by Dourish (2001). Our point of reference is thus the phenomenon of the specific case presented below.

We document and present the case in detail in an attempt to capture all phenomena and events, which could inform the analysis of the case from the embodiment perspective. To document the case we have during the service journey numbered and described every step (defined as any interaction with the system, with other persons or as own my problem-searching reflections) in a log text (diary). Along the description of each step, a screen dump was made when possible of the actual appearance of the interface in the web browser.

The 'steps' are defined as 1) an action performed in an interactive system (e.g. a selecting and clicking a button) 2) as the user's reflection, e.g. on change of strategy, 3) events during a conversation between humans (e.g. between me and my mother, or between me and a hotline service worker). Steps thus can be different in length and importance. I include the 'micro' interaction of e.g. clicking "OK" buttons in the interface in our log. The micro interaction is also embodied interaction, although not cognitively present to the user. This type of micro interaction may not take of user's attention, but it slows down the service journey: e.g. the logon procedure via NemID it requires 6 to 7 steps of typing in user name, password and secret key number. I have translated the Danish terms, which appears in the interfaces, tax regulation descriptions and other documents.

The method we used could thus be described as a modification of classic "think-aloud" test / "cooperative evaluation" (Ericsson & Simon, 1984; Wright & Monk, 1991). In this case the task to be performed is a real case (with economical consequences) that is defined by reality outside the typical lab-based test-situation for "think-aloud" tests. As a researcher I also must add an extra element of self-observation since I need to describe every step of my actions and thoughts in detail.

What is different from the traditional think-aloud test is thus that the “thinker” (the user) also is documenting and analysing. We could call the method a “step-by-step self-observing think-n-write documentation of service journeys”. As each small step of the service encounter was described in the text file by the research directly after completion of the step, the dangers often affiliated with self-reporting, such as memory lapse or tendencies to construct explanations and causalities, could be avoided: The research had no idea of where the service recovery journey would go or if the problem would be resolved.

The methodological challenge of when and how to encourage the user’s spoken expression of thoughts to the observer, as discussed by Boren & Ramey (2000), is thus replaced with the methodological challenge of capturing one own thoughts. As the service journey however is sequential, and since the interaction with the self-service system only progresses if the user – in this case me – interacts, there have been very good opportunities to document both actions, screen appearances and thoughts before proceeding to the interaction. An exception here is the telephone conversations, which have been summarized and documented as text immediately after the end of the conversation.

My professional and academic training in interface design and system design may also influence my observations as well as my interaction with the system, and thus influence the analytical starting point for the exercise. However, within the fields of system design, information architecture and usability testing there is a wide-spread use of experts, including the software designers themselves, in the testing of the consistency of the information architecture (navigation) as well in the discovery of usability problems: In cognitive walk-through the system developers or interaction designers examine the logic coherency of the menu options (cf.: Lewis, Polson, Wharton & Rieman, 1990; Polson, Lewis, Rieman & Wharton, 1992). In heuristic evaluation of user interfaces (Nielsen & Molich, 1990; Molich & Nielsen, 1990), a few professional persons evaluate the user interface.

4. The Case

4.1. Tax Reporting Service Encounters in Denmark

The service encounter with the tax authorities in Denmark is for the typical salary earner or receiver of welfare benefits based on self-reporting. This has been combined with increasing automation through Skat’s retrieval of tax-relevant information from employers, pension funds, social welfare institutions and banks. Citizens normally need only in special cases to report to tax authorities. One of these cases is the service-related tax reduction. The service encounter has thus become very automated, and mostly invisible.

Since 1903 the Danish tax system has been based on citizen’s own yearly reporting of tax. This has traditionally taken place through a paper form. During the 20th century number of fields grows from initially very few to about 30 fields in the 1950’s (Rigsarkivet, 2014). Since 1970 Denmark has a system of income tax, implying that employers and other payment institutions (e.g. pension companies) pay the employee’s or retired person’s tax directly and report this directly to the tax authorities. Citizens were presented a pre-printed form filled with the financial information already

obtained by the tax authorities, e.g. paid salary and deposits in banks. The citizen is thus only to add supplementary information such as tax reduction or correct wrong information. Since 1996 a web- and phone based self-service allows citizens to report the tax online. The uptake was slow in the beginning, but at year 2000 about 60 per cent of all tax reporting was made through the self-service technology (Rigsarkivet, 2014).

Citizen's self-service in relation to public authorities has been made mandatory via three laws (no. 558 (June 18, 2012), no. 622 (June 12, 2013) and no. 552 (June 2, 2014) (Digitaliseringsstyrelsen, 2014b). Since December 2013 it has been mandatory by law for citizens to use the self-service technology (skat.dk) to report tax (Digitaliseringsstyrelsen, 2014a). This also includes that all communication to and from public authorities takes place digitally (Digital post), as well as a ubiquitous authorisation system (NemID) that is used both by public authorities (e.g. tax) as well as by private organisations e.g. banks. It is however possible to obtain either a permanent or temporary exemption from digital post if a citizen can prove that she or he is incapable of using the digital system or has no access to a computer at home. Other persons, e.g. family members can be authorized to manage the interaction with the authorities.

According to the "Scorecard" on the progress in the digitisation of the public administration, issued by the Danish Agency for Digitisation, currently (July 2015) 353.925 persons are permanently exempted, where as 155.830 persons are temporarily exempted (Digitaliseringsstyrelsen, 2015) out of total population in Denmark of 5.668.743 persons (1st quarter 2015, Statistics Denmark, 2015).

4.2. The Specific Use Situation

My mother is born 1937, is retired and has no computer and has no intention getting one. She is exempted from digital post, but she has a NemID login. Since she does not use the self-service system for tax reporting at Skat.dk, so she has authorized me (via the authorization option offered by the tax authorities) let me see and correct her tax. The use of assistance from a family member is typical for elderly citizens, according to a governmental report on the use ICT in the Danish population (Wijars-Jensen, 2014: 13).

My mother lives in her own home and has for 2014 expenses from construction work in her garden, for which she wants tax reduction, according to law that was introduced June 2011 (LL § 8 V in law no. 1017, Oct. 28, 2011; Retsinformation, 2013). The tax reduction has in Danish different names e.g. "BoligJobordningen", "håndværkerfradraget", "servicefradraget". In the lack of an official English name, I translate it to the „Service-related tax reduction“. The maximum tax reduction is DKK 15.000,- (approximately EUR 2.000,-) per year.

4.3. Case Description

The service journey presented below started around April 12, 2015 as my mother leaves a voice mail message to remind me her request for my help to report a tax reduction before May 1, 2015. The service journey ended April 26, 2015 as the tax reporting was finally completed by me through the self-service system. In the follow-

ing the service journey is described in detail in 242 'steps'. For the sake of overview, they have for the presentation here been divided into five phases.

4.3.1. Phase 1: Expecting a straight-forward service journey

Step 1 - 3: My mother asks me, as she has done earlier years, for my help to report tax-reduction to Skat.dk's online system. She does not have a computer and does not know how to use the system. Neither she shows any particular interest in knowing how the tax reporting is made in the Self-service system. We discuss whether the deadline for reporting has been transgressed, but at Skat.dk's landing page for this tax reduction no deadline is mentioned.

Step 4 - 10: She asks me to help her login, but she has forgotten her password. I remember that she once has authorized me in the system to take care of her tax, so I press the 'login with authorization' button and is transferred to the national authorisation system "NemID". Here I type in my user name, password and a number code that is printed on a cardboard paper (so-called 'key card') issued by NemID. By mistake do I type in the wrong number and get an error message, but type in the right number subsequently.

Step 11 - 12: I am shown a page at Skat.dk where I either can type in a person's civil registration number (CPR number), or press a button called "Show List". I assume that the list will show the person(s) for whom I have authorization, and press the button. That appears easier than typing in my mother's CPR number, with the risk of typing it wrong or in a wrong format.

4.3.2. Phase 2: Problems Begins – looking for alternatives

Step 13 - 15: I get an error message from Skat.dk: "You do not have access to the selected page". I don't understand the reason, I press back in the browser. I get a "Document Expired" message from the Firefox browser, but I press the Try Again. I assume that the document (page) is set to expire due to security reasons. I press 'Try Again', and get a warning message that Firefox needs to resend.

Step 16 - 18: I press 'Resend' and now I suddenly can see the CPR number of my mother listed on the page. I press the "Continue" button and the main menu page at Skat.dk for private persons is displayed. I can click on links to see my mother annual tax return for 2014, I can click to correct it (e.g. report a new tax reduction), I can pay back taxes. And finally there is a specific link "Report service-related tax reduction" ("Indberet servicefradrag (håndværkerfradrag)). The latter is precisely what I look for, so I try to click the link. Although the text becomes underline when I move the mouse pointer over, the link does not respond. This appears to be a simple technical problem: In status bar of the browser I can see that the link points to "Javascript void()", which means that there is no action for the software to perform when the link is clicked.

Step 19 - 20: I change strategy and click on "Correct tax return for 2014" because I know this way from the previous years. On the next page I see that the link "Report service-related tax reduction" again is inactive, this time marked as so. I start to think that the deadline for reporting anyway has been exceeded, although we did not find any deadline mentioned. On the other hand, this is end April 2015, and the tax reporting concerns 2014, so it may be too late.

Step 21 - 23: Even if the link is inactive, I examine a last possibility: to scroll down in the Tax return report to field number 460, which is about service-related tax reduction. Normally, this is the place where I report the figure. Next to the input field, there is an icon that represents a pocket calculator. At least, this is what I find out when I read the help text “You must click on the pocket calculator to change the information in this field”. I don’t understand what is meant with the term “pocket calculator”, until I see the icon. However I will do not know what it will do. I press it, as instructed. A white / empty pop-up window appears on my screen.

Step 24 - 36: I assume that the empty pop-up window is a technical error. I switch to see the HTML source, to see if something cannot be rendered, but this is also empty. I assume that my Firefox browser is causing the problem – as it did earlier, so I close the browser and repeat the entire in-log process in Safari for Mac OS. Same result: empty pop-up screen. I ask my mother to ask her to call the tax authorities. I want her to find out if the deadline has been exceeded.

4.3.3. Phase 3: Tax Hotline Encounter – Suspects: 3rd Party Tools

Step 37 - 72: My mother calls the tax hotline, call me back on a voice message that deadline is not exceeded. It is however soon approaching: May 1st. I call my mother back, and we agree that I try to logon again. The same blank pop-up window appears. I call the tax authorities and find my way through their call sorting system (“Press 1 for..”). While waiting 7-8 minutes in the virtual queue I try the other browser again, but with same result. Now I know I can tell the hotline-helper that the problem is not related to the browser, excluding some of the possible errors.

Step 73 – 90: The lady in the hotline believes that the problem is caused by my Java is not up to date. She consults a colleague, and a new voice comes to the phone. She thinks that the blocking of pop-up windows causes the problem. I try to explain that the pop-up window is actually shown. I get the idea that maybe the ad-blocker I have installed as a plug-in in Firefox could produce the problem. I can feel she is getting impatient, so we end the phone conversation. I close the browser and logon again. That doesn’t solve the problem.

Step 91 – 116: I download and install Java. I start the browser again. No change.

4.3.4. Phase 4: Bug reporting

Step 117 – 145: In my lack of new ideas I start reading the instructions at Skat.dk for the tax reduction. A pop-up screen opens – correctly – on my screen. It informs about the rules for service-related tax reduction. I click on “More information”. At the new page more can be read about conditions and rules, but one can also provide feedback and rating. What is being rated is unclear, but I can choose between five different smileys ranging from very happy to very unhappy. Out of frustration I choose the most unhappy smiley. I discover the link “Kommentar”, click on it, and am presented with a quite large text input field. Here describe the problem (which I assume) is cause by some combination of browser, operating system, plug-ins and the java scripts on the server. I state the name and version number of the browser, plug-ins and OS. I press ‘send’ and receive a receipt. I close the browser. I open the other browser to examine if the problem still exists. It does. I fill out the comment box again with information regarding the other browser, and I press ‘send’. I receive a receipt.

Step 146 - 162: I wonder if I can communicate the problem via mail to increase the likelihood that my message will be read. I search for a possibility to send a mail, but realize that I don't have this option in the interface, probably because I am logged in as advisor for my mother. She does not have an email address. I log out, and log on again as 'my self'. I click on menu item 'Contact'. Here I am encouraged to use the telephone hotline, but I prefer the mail, since I want my message about the bug to reach the right place in the organisation, and since it is a bit complicated to describe. I click "Write email", and a pop-up window appears. When selecting "Send secure mail to Skat", I am prompted to select from a long two-level drop down menu the topic that fits my query. I don't find any "report a bug" option so I select "Håndværkerfradrag (servicefradrag)" (the type of tax reduction in question). When arriving at this page, I am presented with FAQ's and different guides. Again I am encouraged to use the phone hotline. Finally, at the bottom of the page, I can click on "write mail".

Step 163 - 170: I start writing, describing the problem, as previously, as a technical problem. Out of a sudden I get the idea to see if this "pocket calculator" which should be used to report the tax reduction information, works in my case. It is easy to find out, now when I am logged in as myself. I open a new browser window, and follow the path to report a fictitious tax reduction for me. I don't plan to send it, just to see if the "pocket calculator" opens correctly. The pop-screen is shown correctly! I understand that the problem is related to my login identity. I reformulate the email to reflect this, but still mentioning the technical details. I press 'send'.

Step 171 - 177: Shortly after I see in my email client that I have got mail from Skat.dk. I click on the link in the mail to see the response. I am taken through the logon procedure again at NemID. I open the email, which states that Skat gets many questions regarding this tax reduction, so this is a standard mail with FAQs. In other cases, one is encouraged to use the phone hotline... So I'm back where I started, not being able to report the bug or problem. I am not closer to being able to report my mother's tax reduction, even if I can do. She cannot logon as herself because she has forgotten the password, and I cannot report on her behalf.

Step 178 - 205: A couple of days later I try to logon again with authorization to report her tax. My small hope is that someone at the tax authorities has seen my message and corrected to problem. But the problem remains and I still get a blank screen.

4.3.5. Phase 5: Hotline contact number 2 – final problem solving

Step 206 - 211: I call the tax hotline. After going through the call sorting system and waiting 4 minutes, I get in contact with a lady. I explain the problem. She asks me my mother's civil registration number, which I tell her. She says that my mother hasn't authorised me to report tax reduction, only to see her tax. There is a check mark to be marked at the authorisation webpage. I thank the lady and hang up. I speculate that it would have been nice if I had got this error message or explanation in the first place.

Step 212 - 222: I want to call my mother to get her a new password, so she can logon and grant me the authorisation. She is not home. I go to skat.dk, type in her username and click on forgotten password. I am redirected to "NemID". At the NemID page I see that I have to submit the serial number of her key-number cardboard card, which I don't have. I call her again, but she does not pick up her phone. Some time later she calls me back. I explain what she has to do, and she gives me the serial

number. I type it in while she is on the phone, and I tell her what the system responds: she will receive a letter in a couple of days.

Step 223: Two days later, in the evening she phones me to tell me that she has received “a letter with a lot of numbers”. That evening I am busy with other things, so we agree that I call her back the following day. We then agree to meet three days later. I ask her to bring all the documents with her.

Step 224 - 238: We meet Saturday April 25. My mother created her new NemID password. She logs on (with my help) on Skat.dk. I guide her to the “report a service-related tax reduction” page, and I type in the information needed: Amount, registration number of the service company and the date of payment. I check to see whether the tax return message on the screen already has been changed, but that is not the case.

Step 239 – 242: I look for the place at skat.dk to change the authorisation rights, so I in the future can report my mother’s tax reduction. I find it easily, and mark with my mother’s consent the check mark that means that I get full rights. I log out. Case ends.

5. Case analysis

The service journey involves human actors, interactive systems (interfaces) as well as the different software that affords the interactivity. With concept of affordances borrowed from the HCI research (cf.: Gaver, 1996; Turner, 2005; O’Neill, 2008) we can thus see them as interconnected, comprising an ecological entity. During the service journey interaction between a user (me); a customer (my mother); two different browsers; several GUI’s / interactive services: Skat.dk, NemID (embedded in Skat.dk, as well as independent page), two different browser plug-in software (Ad-blocker and Java); the Java download webpage; the Java installing procedure on the PC, the Google search engine; a voice response system at Skat’s hotline; and three unnamed service workers at Skat. All these entities are embodiments of the service encounter.

Until the appearance of the blank pop-up screen (step 23), three small episodes deserve attention: 1) My mother’s inability to remember the password, 2) my own wrong typing of my own password, and what appears being a pure technical problem 3) my mothers CPR number is not shown as default at the list of person for whom I administrate the tax reporting. In the first two ones, the simple and very fast real-world experience of being recognized as “you” by another human being, or in this case making the service provider aware of my person and the information related to becomes a relatively long service journey when it is embodied in computer code. We can explain this through the need for data protection and privacy. The analytical focus on the many steps involved in the login procedure is however very good example of how the embodied interaction approach helps describing how the ICT-centric service encounter is different from other types of service encounters.

In the latter episode my mothers’ name is not default displayed. When trying first time a ‘no-access’ message is shown, the second time my mother CPR-number is however shown. Retrospectively seen, this episode could be seen as an early sign of the problem which persists for the next 180 steps as the search for the cause for the

blank pop-up screen goes on. Phenomenologically seen problem can thus be described as the conflict between my a priori mental model of the service encounter (my cognitive construction of it), my cognitive model of the self-service system and the actual embodiment of the service through the computer code rendering the interface. Since the interface is the actual embodiment of the service encounter, I can do little with my cognitive models, except trying to make them fit to the actual embodiment of the service encounter. We here see how the embodiment of the computer code has a power, which cannot be found in non-computer based service encounters. The embodiment of the ICT-centric service encounter is not up for discussion or negotiation between the customer and the service provider. The interface is silent about the reason for not providing me the desired service. The self-service system is trapped in its own embodiment (seen from the customer perspective): the computer code can only produce what it has been programmed to do.

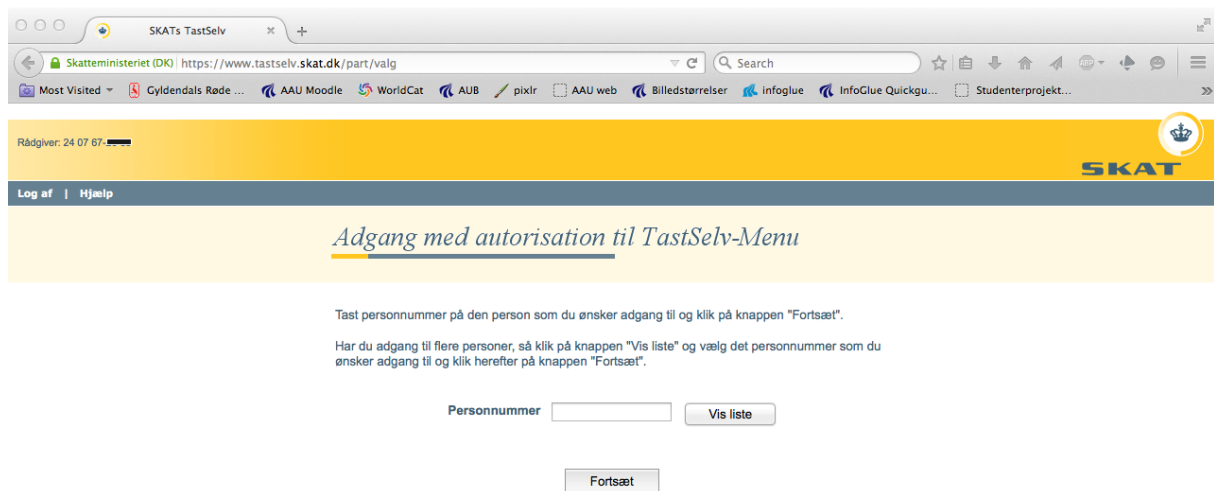


Figure 1: “Access with authorization” – empty list (no access) Skat.dk accessed April 14, 2015

Later in the service journey I experience human representatives (embodiments) of the service provider, with whom I can conduct a more open dialogue. This experience requires me to re-conceptualize my mental model of the service provider into two distinct and different entities, one that consist of ecology of browsers, third-party plug-ins, screen interfaces, keyboard, mouse, internet protocols, server-side scripts and all the other digital elements in the self-service encounter and one which is the dialogue with the human service helpers. When I have passed the embodiment of access control to the human service staff, namely the phone menu where I have to press 1 for... and 2 for.. I do actually experience a very different kind of service provider, namely human service representatives. With varying degrees of success they suggest causes for the problem, and finally lead me to its resolution. I thus need to connect and integrate this experience with the embodiments of the interface that do not respond in the way I anticipate.

The co-creation of the service recovery could be described as the user's (mine) active application of different strategies for the sequential testing of different hypotheses about the cause of problem. The most prominent strategies are to change browser, as well as retrying after some days. Where the first strategy assumes a local, browser-related cause, the latter assume technical problems at the server-side. Both strategies are however challenged by alternative or supplementing possible reasons: The inactive links as well as the problems of showing my mother's CPR number in the list of 'administered persons' could point both in a technical direction,

as well in an 'administrative' direction (deadline overdue or other formal reason why the service is not available). The multiple hypotheses leads to a blurred choice of strategies – sometimes one strategy is followed, sometimes another, this often without a logical consistency. One of the strategies is also to seek advice through the phone hotline provided by "Skat".

When we look at the conditions for applying the strategies, there are big differences between the self-service encounter and the phone-based encounter: Where the self-service encounter offers endless possibilities for retry and experimenting through the change of technical context for the service encounter (e.g. change to a different browser or logon as another person), the human service encounter is characterized by being condensed in time, leaving little time for consultation or cooperative problem search. Experimenting is not possible, but instead a deeper and wider contextual understanding is possible, to the extent that the service person successfully can see and understand the problem, e.g. through an enhanced display of settings and user-rights. The service encounter could thus also be described as an explorative examination of a (partly) unknown space of possibilities calling for a break-through insight (cf. Perkins, 2000), as a situated learning experience (cf. Lave and Wenger 1991; Wenger, 1998), however without the reward that normally is affiliated with situated learning, namely to get closer to centre of a community of practice, or the general reward of achieving generic skills.

My attempts to contribute to the service recovery, and to prevent future service failures, namely by reporting what I assume is technical problem, fail. I do not know if the relevant persons read my message, but from the standard response on my email, I realize that Skat wants handle dialogical customer encounters such as questions and complaints via phone. As I want to report a software problem, this embodiment of the interaction / service recovery interfaces appears not suitable for the purpose. The co-creation of the service recovery could thus in this case be described as (failed) attempts to communicate discoveries and potential causes of errors to the service provider. The attempts fail because the service provider has not one, but two entry points: An ICT-based which is not designed for this type of feedback, and a human (phone-based) which is not capable of seeing or understanding the technical embodiment of the service encounter.

5.1. Signs of ICT-centricity of the service encounter

In the theoretical introduction I suggested to make a distinction between "ICT-based" and "ICT-centric" service encounters. Where ICT in the first type do not shape the service encounter in any noticeable way, ICT in latter type defines what Harris and Henderson (1999) would call the "mythology" of the system design. What I here suggest as "ICT-centric service encounters" is my application of Harris and Henderson's (1999) "Standard Mythology of System Design" on the service encounter. This standard mythology represents a wide-spread but problematic set of assumptions often applied by system developers: 1) that system requirements are clear and well defined, 2) that the system architecture can meet all system requirements, 3) that it is possible to define clear choices for users when they interact with the system, 4) that it is possible to maintain consistency throughout the design (ibid. 89). As Harris and Henderson (1999) point at there are some fundamental assumptions behind this: 5) that "[t]he parts of the system must interact according to a pre-established harmony defined during its design" 6) that "[t]he job of the designer is to discover, clarify, and

when necessary invent the rules that define that harmony, and embed them into the computer system". 7) that "[t]he users must interact with the system in terms of the language or ontology that these rules create." (ibid. 89). The problem of these assumptions, according to Harris and Henderson is shortly described that real world seldom follow a fix set of rules that can be modulated in a system, but instead do 'the particularities' of the real world require a constant re-interpretation of rules.

In the ICT-centric service encounters, my hypothesis would be, this mythology flows from the ICT system itself to all other parts of the service encounter, including the human service providers. It is thus not the use of ICT in the service encounter that is interesting, but rather how the 'mythology' influences the whole service design. The hypothesis would thus be that when particularities occur in the service encounters (the deviation from the ideal service blueprint, e.g. a "service failure") the process of service recovery must also acknowledge the ICT-centricity of the service encounter. It means that the service recovery must include and embrace the technological embodiments of the service encounter on the same level as the users expectations, e.g. through the ways a service failure can be discussed between the customer and the service provider. The service recovery must also be mediated between the embodiment of the technology and the embodiment of the user's mental model of the service and the system. But the self-service encounter is framed rigidly through the user paths in the system, designed by system developers and interaction designers. The human service encounter includes the possible deviation from the plans and trajectories already set, the deviation that can foster the 'break-through thinking' necessary to escape the trap of the service failure problem.

6. Discussion

The starting point for Dourish is that "[e]mbodied phenomena are those which by their very nature occur in real time and real space" (2001, 126) but he develop this definition to: "Embodiment is the property of our engagement with the world that allows to making it meaningful" (2001, 126). Embodiment is thus the general phenomenon of making sense of the world (starting with being in and acting with the world, not as an initial cognitive model of the world, which then successively is projected on the observation of the world (cf.: Schear, 2013).

As introduced in the beginning of this paper, Dourish' vision for tangible and social computing is based on this embodiment of the world:

"we encounter, interpret, and sustain meaning through our embodied interactions with the world and with each other (...) [t]angible computing encourages users to explore, adopt, and adapt interactive technology, incorporating it into their world and into everyday practice. It allows users to create and communicate the meaning of the actions they perform, rather than struggle with rigid meanings encoded in the technology itself. Social computing similarly recognizes that meaning is something that users create through the ways in which they interact with technology and with each other" (Dourish, 2001, 127-128).

Now the question is to which extent these ideas makes sense in the relation to the above-presented service encounter. A first observation could be that the service encounter does not seem to have been designed with tangible or social aspects of the interaction in mind. Some social interaction is produced by my mother asking me to

help her, as well by the contact with the hotline service workers at Skat. The tactility seems apparently absent: No touch-sensitive technologies (e.g. a tablet or smart phones) are used and the service encounter has hardly any physical representation. Finally, the “content” of the service encounter is highly cognitive: Tax reporting. In this way, the case appears hopeless as an example of embodied interaction.

If we start with the common-sense concept of ‘familiarity’ we can observe that the graphical designers have transferred and transformed the visual identity and the structure of the traditional printed paper forms to the webpage. If we compare the tangibility with the earlier tax-reporting method, where citizens received a partly pre-filled form, some tangibility has disappeared. The printed paper version afforded private notes in the draft copy that was kept by the citizen. The paper version would not prevent entries in the form or show a blank page. However, nor the citizen would, as in the digital version, receive immediate feedback if a figure was wrong or entry in a field was not permitted. The paper version would not, except the citizen’s signature that confirms the correctness of the information, keep track of the identity of the person entering the information. The paper version of the self-assessment tax form is essentially a static one-way communication multi-user platform.

The central visual concepts in the tax declaration remain the same. The familiarity, we would argue in the following, however disappears when the printed – static - pages now have become electronic - dynamic – forms. The much cited Heidegger concept (which also Dourish builds upon) of the tool which is “ready at hand”, becoming one with its user, versus the tool that becomes “present at hand” e.g. because the tool does not fulfil the desired function or where the user reflects over the possibilities of the tool, could be useful here (cf. Dourish, 2000, 109; Winograd & Flores, 1986). As a tool for user action, the electronic form resists in a fundamental way the user’s activity and becomes “present at hand” when no text can be entered in the input fields or when the form is not displayed at all. The printed paper form, which is still used as visual reference, only becomes “present at hand” if the user does not know what to write in the specific field, or if the pencil is broken. The visual familiarity is thus misleading since it indicates affordances that are not there: If an input field is write-protected or a page shown as blank, the promised familiarity breaks down as the tangibility is absent.

Using a wider less physically oriented definition, one could argue that the case contains much tangibility. On the most basic level a single binary electronic signal (that can be set to “false” or “true”) prevents the display of the screen where the tax information can be submitted: The check-mark of the relevant rights is not checked. This state produces all the following consequences. The tangibility is very well hidden: one should know that “it is there” somewhere in the system, or rather that this checkbox interface could be rendered on my screen if I know the right commands. It is a brilliant example of Dourish’ observation (2001, 140) that computers have a dual nature of both carrying representations of the real world as well as being “abstract” embodiments (in terms of code and processing in the medium of electric currents).

The discussion above about the tangibility – or the lack of tangibility – in this ICT service encounter reveals some uncertainty about the concept. What does the “real world” actually mean and where does it stop and becomes virtual? This discussion obviously expands beyond this case, and points at a much larger philosophical discussion in which Dourish engages. The purpose of this paper is not to attempt to contribute to this discussion, but to test the applicability of Dourish’ concepts. Where we observe lack of clarity in the distinction between ‘cognitive’ and ‘tangible’ in this

case, we can instead simply note that the tangibility in this case can be translated to agency: When the action which the user wants to perform cannot be executed due to phenomena external to the user, the user agency is lost. We would thus simply argue that the tangibility in effect is about user freedom to act. What we mean by “external to the user” is that the hindrance does not lie within what the user recognizes as him- or her self. The hindrance would be internal if I have a broken arm and could not write, or if I know that I don’t know where to click in the user interface and blame myself for my lack of knowledge. The absence of tangibility equals the lack of agency, even in the case where I am overwhelmed with clickable options in the interface. I would argue that in the situation, the user’s perception may change forth and back from Heidegger’s “ready at hand” and “present at hand”, as the “ready at hand” here means that I engage in yet another attempt to solve the problem and go “in dialogue” with the interface, and “present at hand” means that I reflect on the lack of success and maybe consider a new strategy. The tangibility – or lack of tangibility – moves across these two situations. The “ready at hand” situation is not more tangible than the “present at hand”, although it may look so.

If I instead blame the providers of the ICT based service and conclude that nothing in my control could mend the problem, it becomes clearly external to me, and obviously also “present at hand”. The service encounter presented above oscillates between being an internal cognitive process in me where I speculate about possible causes on different levels, an interactive ICT based encounter between me and the different interfaces that are shown on my screen which in itself oscillates between being “ready at hand” and “present at hand”, and finally social interaction – conversation – between me and my mother, my mother and the tax hotline, and between me and tax hotline service staff which also have elements of being both “ready at hand” (e.g. when we experience that we understand each other) and “present at hand” when I am presented with limitations of the conversation, e.g. the queuing system / voice response system that interrupts my direct desire for a conversation, or when I am not understood in the phone, or when I am redirected to another service person which needs the explanation one more time.

The service encounter here is embodied in all its smaller parts such as the abstract concept of a tax reduction (which essentially means money), the less abstract objects of interfaces that are visible representations of rules (on different levels), and the complex structure of different software code that physically, but invisibly, produces the screen interface and the (lack of) interactive options. But all these elements or entities do not form a coherent body. If we should look at the entire service journey, it consists from the user’s / customer’s (my) perspective of a number of disintegrated ‘body parts’ that are embodiments but do not work as one body. Independently they work and function well and perform their designated task, but they do not operate together.

We suggest that concept of embodiment is based on inter-subjectivity (cf. Dorish, 2001, 132): Inter-subjectivity appears in the different ways the interface is rendered when I am logged in as administrator for my mother, as ‘my self’, or when my mother is logged in. In the first case I see a blank page, in the two others I see the interface correctly. Here the inter-subjectivity however takes a radical form through the three different user-logins / user accounts, that each shows a different interface options, or as in the central example, just a white page. The different user accounts produce thus different embodiments of the service encounter. The strong coupling between a specific user account and a specific embodiment of the interface prevents me from

understanding the problem. One could provocatively say that the strong concept of embodiment hinders my cognitive understanding of the problem, and thus also my learning process of understanding the problem on a higher level. It appears thus as if the embodied interaction approach could contribute in future research to the conceptualisation of customisation and personalisation (cf.: Fan & Poole, 2006; Sørensen, 2013; Sørensen, 2015)

6.1. Skat.dk as a ‘community of practice’?

Besides the concept of tangibility, the social aspect plays a central role in Dourish embodiment concept: Computer systems are used in communities of practice (cf. Lave and Wenger 1991; Wenger, 1998) as well as they serve as communication tools. While they shape the practice they are also at the same time expressions of this practice, reflecting its assumptions and conventions, Dourish observes (ibid. 186).

If we now apply the concept of “communities of practice”, a concept which traditionally is used in the work-oriented studies of computer use, on the service encounter with Skat.dk, the first observation is that I as a user stuck in this particular problem do not belong to the centre of this particular community. The reason for that is produced by the subjectivity of the situation as discussed above and my peripheral status in the “community”: I do not have the full overview of how the different logins / user-identities (my own, my administrator role, my mothers) produce different affordances in the interface. Step by step I construct this overview, which however only is completed when I talk the second time to the hotline service staff, who looks up the rights assigned to me and tell me that my mother should grant me rights also to report a tax reduction. We could thus depict the service encounter as an apprenticeship where I learn from practice (clicking around in the interface) and from the advices from the masters (the hotline staff). One could argue that it is problematic to apply the concept of “communities of practice” on the service encounter, but as the service encounter also becomes a praxis-oriented learning process and as it includes more knowledgeable persons, I will argue that the concept also is productive outside a work context.

The problem with learning interpretation of the situation is that I initially was neither prepared for this process of exploration and learning nor interested in it. Conversely, I assumed myself to be a customer, a sovereign user, who acts in a service encounter by controlling my interaction with the system. As the blank screen is presented to me, the expected ICT service encounter breaks down and my role is converted to being an apprentice or pupil in the search for an answer. The experience of the service is thus radically changed in a very short moment: The service failure appears suddenly and without any previous indicators. This sudden service failure produces a breach in the embodiment of the service that possibly are less often and less sudden in service encounters with human beings.

7. Conclusion

If we should try drawing more general conclusions from the single case that have been presented above, it would be that Dourish’ embodied interaction framework do offer some new perspectives for the understanding of the ICT-centric service encoun-

ter. It does so, because the focus on the embodiment of the interaction relocates the analytical vantage point from a top-down structural view, which could be represented in service blue print, to sensitivity in the observation and description of an actual service encounter. Thereby we are able to acknowledge how the ICT as material for design of service encounters (cf. Löwgren & Stolterman, 2004) shape the service encounter, maybe in a way, which is not desirable. Examples could here be the many steps involved in the authentication process or the enigmatic blank pop-up window. The embodiment approach is thus particularly helpful in the analysis of the service failure, since it allows a dual focus both on the technology and the human actors.

The embodied interaction approach is also helpful in conceptualising the apparent disconnectedness between the many human and technical actors in the service failure. Instead attempting to point out one single source failure, which in many cases – also in this – in reality is impossible or problematic, it turns our attention to intersubjectivity in the interaction: Each human or technical actor in the service encounter is perfectly embodied, but the different ‘body parts’ do not work as one body.

Finally, the embodied interaction approach points at some – in this un-utilized - possibilities in the co-production of the service recover process: if the embodiments of the service encounter, such as the customer experiences them, can be communicated to the service provider in their complete embodiment (e.g. here that the hotline worker could see my screen, or that provides full and comparative overview of its settings (e.g. that I initially have not been assigned with full rights to my mother’s tax reporting), the service recovery could be eased. This is not the place to suggest practical solutions, but the idea that I try to convey is that if the service recovery was facilitated as an embodied co-production process, not as a cognitive trail-and-error search process, the quality, speed and ease of the service recovery process could be improved. What we also can observe here is a user who actively attempts to contribute to the service recovery, almost taking over the responsibility for its successful end. Now, it is open for empirical research how this also would be the case in other service encounters, as well as identifying the conditions for the user’s active participation in the service recovery, but potentially this is also managerial interesting to understand, in the light of the general value created through co-creation and co-production. In this way the embodied interaction approach to the ICT-centric service encounter could produce innovative solutions, as well as the improvement of the dialogue with customers involved in ICT-centric service encounters could contribute to the innovation from the ICT-centric service encounter.

In other aspects it is less clear if the embodied interaction approach can be helpful for the analysis of ICT-centric service encounters, and their eventual failure and recovery. The service encounter chosen for analysis in this paper could be described as a cognitively dominated one: The subject for the service encounter is a highly abstract matter – reporting of a tax reduction claim – and the service encounter takes place in ICT environment which is not very embodied in a common sense understanding: there are no tangible interfaces and very little social interaction via the ICT-system itself. The social interaction takes place via telephone. It is thus a strange and difficult case to analyse as embodied interaction. With Dourish (2001) we however extend the concept of embodiment also to encompass the embodiment of the computer code in the for humans visible form: interfaces, and for machines understandable way: as electrical current. Now the danger becomes that we a definition of embodiment that is so broad that it does not produce any new knowledge. This appears to be a weakness of Dourish’ concept: It is unclear whether he understands embod-

ied interaction only from a human perspective, thus requiring computer code to be a perfect representation of the world, or whether he also acknowledges the computers' embodiment in terms of their code and electric currents, but thereby do not really do much than describing the eternal problem of all programming of computers: the gap between the real world in all its diversity and the reduced representation of it in the descriptions of the world, here descriptions that are made in computer code.

Our choice of case is a service encounter which in two ways are defined by rules, namely both the rules that make up the computer code, but also the rules make up the tax legislation and legislation on mandatory self-service. In a double way it thus points at the conflicts emerging between the assumed regularities of the service encounter (the service blueprint of the straight forward typing in data in the online tax-reduction form), and the particularities emerging when this service encounter breaks down for unknown reasons. The discussion of the tension between regularities (which can be foreseen in computer code) and the particularities that constantly emerge due to the complexity of the world (cf. Johnson, 2001) is however difficult to find answers for in Dourish' (2001) work. It appears as if he assumes a very regular world, one which can be modelled, but this would contradict is starting point in the embodied world. The question is whether Dourish' embodied interaction approach promise a service encounter experience that in many cases can not be fulfilled due to the emerging particularities? It is also unclear if we with Dourish (2001) should strive for creating a service encounter, which is very tangible and social (embodied), and try to avoid the cognitive parts in the service encounter? Where this approach in some very simple service encounters could make sense, it would indeed be a problematic approach in the case tax reporting. Also in the more general situation of the co-production of the service recovery in the ICT-based service encounter, a very naïve understanding of embodiment as the opposite of cognition would be problematic: It would assume a user which is not cognitive contributing to the service recovery, thus not offering any substantial co-production to it. If we instead understand the embodiment as the acknowledgement of all the detailed elements, interactions and circumstances that comprise the service encounter, and in the case of the ICT-centric service encounter also shapes it radically, the embodied interaction approach could contribute to the innovation of the ICT-centric service encounter, and service recovery in it.

A central element, and the actual reason for the service failure in the above case, is the different user accounts and their respective embodiments of the information in the system. While this situation may occur relatively seldom in ICT based service encounters, it provides us with the sensitivity of the subjective nature of also the ICT-centric service encounter. This inter-subjective nature of the service encounter may rather be expected in a face-to-face service encounter, which is produced by humans, equal to what Shostack (1982, 55) describes as the difference between the potential and the rendered service. Surprisingly we must also categorise the ICT-centric service encounter as subjective, although it is produced of the same code. That means that ICT-centric service encounter is as little standardized as the face-to-face encounter, and that it possibly cannot really be standardized.

We also observe a tension between the different entities of embodiments: The different software systems (operating system, browser, plug-ins, server-side code, html), the tax regulation, the access rights are each complete and coherent embodiments, and not just abstract ideas, but their embodiments do not interact in this specific case. We develop the idea that the abstract understanding and overview is neces-

sary if the user – customer – citizen should have any chance of co-producing the service recovery. The pure vision of embodiment as suggested by Dourish requires foreseeing all possible problems (tensions) between the different embodiments (here software systems). We instead argue for increased user agency also when this requires the user's abstract thinking. If the vision for the service encounter is changed from a naïve vision of a simple input – output process to the co-production of the tax report, users may in the first place be required to be more cognitively active, but they will also become a more equal partner in the service encounter. We suggest different ways in which the service encounter better can be presented as the learning process it was in this case, and is in other cases where the service fails in the sense that the user cannot achieve the desired goal for administrative or technical reasons. If the process of interacting with the self-service system is seen as co-production of knowledge, then the use of the support both from the side of the service provider, as well as from other users could be conceived differently.

The embodied interaction approach to the study of the ICT-centric service encounters helps elucidating and describing how the character of this type of service encounter is different from all other service encounters. The embodied interaction approach also offers a platform where the face-to-face encounter is seen as the ideal prototypical service encounter, but where the ICT specific elements can be conceptualised into the design of the service encounter. This produce a productive platform for the analysis and design of ICT-based service encounters, as the embodiment of ICT – the ICT-centricity – can be treated not as a side effect the use of ICT, but as an active design condition. This could open for new types of conceiving the dialogical co-creation of the service encounter and service recovery.

8. References

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Online Review Site Data in Service Innovation

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The recognized importance of customer understanding and involvement to successful service innovation has resulted to the development of various cocreation approaches striving for tight integration between customers and the company. While sometimes methods of tight coupling are essential, there is also a need for lighter means for gaining customer understanding amidst the organizational reality of limited budgets and time available. Given this, the objective of the study is to examine ways of virtual customer integration, namely utilizing feedback customers give on public online review sites as an idea source and inspiration for service innovation. This study brings new understanding on how firms can best leverage this tool as a part of their customer integration tool portfolio to support their development activity.

1. Introduction

The idea of companies integrating their customers to boost their development efforts is nothing new. Benefits of such approach have been discussed in the innovation literature for a long time, both in product (e.g. Von Hippel, 1986; Gruner and Homberg, 2000) and service (e.g. Alam, 2002; Magnusson et al., 2003) contexts. This discussion is all but waning thanks to the diffusion of service dominant logic (Vargo and Lusch, 2011) thinking, emphasizing the increased focus on supporting customers' value creation processes. Succeeding in this requires thorough knowledge on the needs and desires of the customer and value-in-context. One effective way to achieve this is to increasingly integrate customers to development processes to cocreate new offerings and operational improvements.

Various means for realizing customer integration in new service development have been proposed such as customer observations (Edvardsson et al., 2012), CUDIT methods (see Magnusson et al., 2003) or having users as a part of the development team (Alam, 2002). Gustafsson et al. (2012) found increased benefits in more active and in depth collaboration with customers compared to passive and unidirectional ways of involvement. Similarly, Witell et al. (2011) have argued that companies should strive for methods that allow tight integration with customers. However, the issue is not strictly black and white. Magnusson et al. (2003) noted that too closely integrated customers might cause them to develop similar mental constraints that professionals working in companies have, which can harm their capability to suggest novel ideas. Second and perhaps more importantly, what are particularly emphasized in real life situations inside companies when selecting means for customer involvement are the costs of the endeavor, both in financial and human resource terms (Alam, 2002). Thus, while more integrative and in depth methods have lots of argu-

ments for them, it is important to also examine the more lightweight methods as they certainly have their place in the hectic daily life inside companies.

In this sense, IT mediated customer interaction is very interesting for various reasons. First, the cocreation activity can be asynchronous and not necessarily tied to a specific time or place. Second, due to the proliferation of user generated content containing consumer opinions on products and services in various virtual environments such as discussion forums, social networking sites and public online review sites, companies can access vast amounts of data containing information about what their customers like and dislike about their offering quickly, simply and nonintrusively (Lu and Stepchenkova, 2015). Interesting in these customer involvement arenas is the fact that customer's themselves are the active party in providing feedback, which has been noted to be very rare when it comes more traditional interaction channels (Alam, 2002).

Online review sites - public web-based services that allow consumers to rate and give open feedback to service producers - are in this sense especially interesting as their main purpose is sharing of product and service evaluations between consumers and companies. They are used voluntarily without monetary incentives, making them an inexpensive approach for collection of customer insight. Unlike facebook, twitter etc. modern social networking sites, which' content is in practice difficult to search and access (see Lu and Stepchenkova, 2015), online review site data is technically rather easy to utilize. Finally, as those generating the content have direct experience from a real life service use situation and context (insitu & incontext), they should have the possibility reflect on the key value drivers and problems and solutions of actual service use (see Edvardsson et al., 2012).

Still, the suitability of online review sites for gaining insight for service innovation is not trivial. They might contain insincere (Mayzlin, 2006) or only overwhelmingly positive content (Brejla and Gilbert, 2014), based on which gaining ideas and inspiration for development might be difficult. Moreover, open innovation research has shown that when customers air their ideas and feedback in virtual environments, they don't necessarily spend much time doing it (Majchrzak and Malhotra, 2013). This raises questions whether the input is profound enough to act as input for development activities. Existing research on utilizing online review data for service development has been conducted mainly in tourism context and has largely focused on quantitative analysis (e.g. Brejla and Gilbert, 2014; Stringham and Gerdes, 2010) which might lead to misinterpretation of data (Banyai and Glover, 2011). Thus there is a pressing need for qualitative in depth analysis on what kind of input collection and analysis consumer reviews in public online review sites can provide for the purposes of companies' service innovation activity. The present study aims to address this gap, the main research question being:

How can online review data support service innovation activity?

The focus is especially on understanding the content users post in their reviews, in order to understand purposes online review site data can best serve.

2. Literature review

In essence, online review sites are virtual platforms, which allow consumers to share their opinions with other about various goods or services they have purchased. Usually in practice this concretizes in a numerical rating and a brief text based description of whether the person was satisfied with the purchase and why. Such services are being increasingly popular and there is variety of platforms available for different topics such as Metacritic for entertainment, Rotten Tomatoes for movies, Tripadvisor for travel and Trustpilot for various consumer goods and services to name a few. Tripadvisor solely contains over 200 million traveler reviews on hotels, restaurants etc.

In addition to their immense popularity, scientific interest in online review sites and consumer review content in the Internet in general has been driven by the fact that such services can have notable influence on people's purchasing behaviour (Senecal and Nantel, 2004). As such, it has garnered attention especially from marketing and sales scholars, aiming to understand this process in more detail by mapping for example the various antecedents and consequences of the phenomena (see King et al., 2014 for broader review).

Majority of this research seems to refer to online review content using the term electronic word of mouth (Hennig-Thurau et al, 2004; Sen and Lerman, 2007; Litvin et al., 2007), though other terms such as online product recommendations (Senecal and Nantel, 2004), online feedback mechanisms (Dellarocas, 2003) or Word of mouse (Stringham and Gerdes, 2010) have been used as well. Electronic word of mouth (eWom) is usually defined as informal communication between independent consumers about a company or its offering (Litvin et al, 2008). Accordingly, the utility of ewom has from company perspective has been mostly focused on how to manage and leverage these processes indirectly to one's benefit, by for example encouraging posting of positive reviews through increased understanding of how consumers determine helpfulness and quality of others' reviews (Sen and Lerman, 2007; Mudambi and Schuff, 2010), drivers of posting reviews (Cheung and Lee, 2012; Hennig-Thurau et al., 2004), or their effect on purchase decisions (Senecal and Nantel, 2004).

Because the present study is mainly focused on companies utilizing directly, instead of indirectly leveraging the informal virtual consumer to consumer information transfer process as most eWom research, I will refer to the content posted to public online review sites as online review data instead of eWom. Also, in terms of online communication arenas, much of eWom research has been conducted in contexts other than online review sites, such as discussion forums etc. As the present study is only focused on only online review sites, there is little reason to use the broader term of eWom.

Some research on how online review data could be directly used in company decision making has been conducted, especially in the travel industry. Litvin et al. (2008) argued that online review analysis can help tourism companies in developing their offering, increasing customer understanding, reputation management and evaluation of their competitive strategy. Brejla and Gilbert (2014) utilized content mining in order to understand which travel service components have the biggest impact on cus-

customer satisfaction and cocreation processes during service provision. Similarly, Stringham and Gerdes (2010) content mined reviews to examine where hotel owners should focus their development resources.

While the tourism literature seems particularly interested in the potential of online review data, studies in other contexts have been conducted as well. Dellarocas et al. (2007) studied how movie popularity could be forecasted based on public review activity. They found that complementing traditional sales forecasting models with review activity measures resulted in a very well-functioning model which could help in marketing design and operative decision making of movie theater owners. In another study, Clemons et al. (2006) examined how companies opting for a particular differentiation strategy can leverage online review data to develop their product positioning. Finally, though it utilized discussion forum instead of online review data, particularly interesting is the study by Andreassen and Streukens (2009), which studied how such content could be leveraged for service innovation purposes. They developed a typology of online discussion content (see Table 1) and found that such data can provide rich information about the desires and needs of consumers with regards to current and future products and services.

Meta Themes	<i>Business practice issues</i>	<i>Usage experience issues</i>	<i>Information requests</i>	<i>Commenting product launches / developments</i>
Themes	Quality of customer service Quality of dealers Availability of dealers General business conduct of company	Quality of service Price - Quality ratio Experience with specific features / functions of service Emotional experience	How to use product / service Technical questions Requests for additional information Experience with category	New introductions Expectations regarding new introductions Comments/desires regarding new introductions

Table 1: Andreassen & Streukens' (2009) conceptual framework of online discussion forum content with regards to service innovation

Notable similarity between the studies listed above is their quantitative orientation, based on algorithm based content analysis (Brejla and Gilbert (2014), examination of numerical ratings given in reviews by themselves (Clemons et al., 2006) or in conjunction with word occurrence counts (Stringham and Gerdes, 2010) and combinatorial measures of review activity including volume, valence (positive vs. negative) and dispersion (Dellarocas et al., 2007). Andreassen and Streukens (2009) are a notable exception with their qualitative content analysis. However, while the resulting typology provides an important starting point for scientific discussion around using online review data for service innovation, their work provides only one anecdotal example from product context about the concrete insight that can be utilized for development

purposes. In accordance to Gustafsson et al. (2012), who criticized customer integration research for being too overly conceptual and focused on listing generalized types, I feel that we need more qualitative, in depth examinations of what kind of benefits various consumer involvement methods have and where do they fall short. Quantitative approaches to online content analysis as used in the research mentioned above, while enjoying notable popularity, run the risk of failing to capture or misinterpret key aspects of service experience (Banyai and Glover, 2011). Thus we need also qualitative examinations of online review content in order to better understand potential of online review data.

Though it seems that online review data has much potential in terms of innovation activity, naturally there are potential issues as well. Various challenges related to the quality of information in online reviews have been noted. First question is the objectiveness of the information. It is for example possible that individuals hostile towards the company post highly critical reviews with little connection to real life consumer experiences. Various technical approaches has been suggested to tackle this problem, though their use is not necessarily unproblematic (see Liu et al., 2007). It has also been noted that companies themselves spread information disguised as consumer reviews in order to gain new customers (Mayzlin, 2006). This might create challenges for example if focal company's goal is to understand better how to improve their distribution network and their vendors are manipulating their online review data.

Other fundamental issues related to the online review sites as communication medium should also be considered. Online review data is usually limited to text based content and numerical scorings. Thus the content is less rich than face-to-face discussions especially when it comes to contextual cues critical for message interpretation (Dellarocas, 2003). However, Gustafsson et al. (2012) found that the communication medium in customer involvement does not have significant effect on the successfulness of new innovations. Second, it is possible that those consumers who are active in posting online reviews do not sufficiently represent the customer base as a whole. In online movie reviews, majority of posts have been noted to originate from less than 30 years old males (Dellarocas et al., 2007), whereas in tourism, single women under 35 seem to be the most active reviewers (Brejla and Gilbert, 2014). The issue of skewed population does not automatically make online review content meaningless, but if the company lacks understanding of the nature of the data, issues can arise (Edvardsson et al., 2012). Final, but perhaps the most crucial question related to content is naturally the extent of which it contains relevant information related to development efforts in the first place. Brejla and Gilbert (2014) noted in their study in tourism context that posted feedback was on the whole skewed towards positive end of the spectrum. This raises questions is there enough critical reviews to gain improvement ideas, calling for further research.

3. Material & Methods

To answer the research question, a qualitative multiple case study of two cases was conducted. Online review data for two software-as-a-service companies was collect-

ed from online consumer review site Trustpilot.com¹. Trustpilot allows consumers to post reviews on products and services they have purchased from different companies. It contains both official company review spaces created by firms themselves and unofficial company review spaces started by active consumers. Each review consists of a short title, review text itself and overall score (1-5). All analyzed reviews were publicly available and visible for anyone visiting the site. Raw data was collected using a self-made ruby script. For each review, it stored the review title, review text, score, time and date of review and reviewer id. The resulting dataset was imported to Atlas.ti for further analysis.

In selecting the cases, several important aspects were considered. First, the amount of unique reviews needed to be large enough to ensure adequate variation in reviews. Second, the company needed to have an official, registered review space. Unofficial space might encourage lower quality and less constructive reviews. Third, industry and offering of the company should be of such that is likely that large share of customers use Internet regularly to minimize the possibility that the online reviews represent the views of very limited portion of the customer base.

Based on these criteria two companies were selected, hereafter referred to as Streaming and Storage. Both had gathered over public 100 reviews to their official Trustpilot review space for their main consumer offering. Streaming offered an online video streaming service, allowing users to watch TV-series, movies etc. from the Internet with various devices for a monthly fee. Storage offered a cloud based file hosting service, which users can use to store whatever they like to the company servers and if so desired, share it with their friends. Storage offered both free and monthly fee based service, which differed mainly based on storage space size and access speeds. As both cases were essentially Internet based software-as-a-service (SaaS) service products, it could be presumed large part of their customer base were active users of the web. In terms of content, Streaming was selected as a baseline case. Its average rating from reviews was approximately 3.8 and provision of feedback was not incentivised. Storage's average rating was higher, approximately 4.5 and the company provided users who posted a review to Trustpilot with extra storage space. Storage as a second case was included partly in order to gain more understanding about the context specificity of usefulness of online review data for innovation and the effects of more positive reviews and incentivizing.

The analysis process started with reading through all reviews and making notes. Based on the first analysis round, the typology of Andreassen and Streukens (2009) seemed to fit the data quite well, even if it was originally developed in slightly different context (online discussion forums). Therefore, both datasets were next coded at the paragraph level following the Andreassen and Streukens (2009) frame using Atlas.ti. Next, content coded for each code was examined first for each case separately and finally cross-compared to understand in depth what the reviews were discussing.

¹ <https://www.trustpilot.com>

4. Results

On average a single review consisted of one short paragraph of 3-4 sentences and seldom covered a large variety of topics, focusing instead on 1-2 key issues. Thus while there were some more holistic overviews among the reviews, majority of them focused on a handful of more specific aspects of the service and service experience. Most often discussed topics were usage experience issues, various features of the service offering and perceived ease of use of the service.

The content the reviews in the two datasets had some surprisingly distinct features. Reviews on Streaming were more critical and thorough, discussed use experiences of larger variety of service features and contained more information on explicit and tacit desires related to the service development. Storage reviews on the other hand contained more explicit recommendations to test and use the service and descriptions of what the service does and what kind of features it has without going into detail of use experience. Hence, stereotypical review of Streaming focused more on what one liked and disliked about the service, whereas that of Storage mainly underlined what one can do with Storage and that it won't let one down. This suggest that the nature of online review content can be quite case specific, which can have important implications in terms of using it for innovation purposes.

In terms of trustworthiness of the data, amount of reviews which appeared insincere or not grounded on real life use experiences seemed rather low. For both cases there were a few individual reviews, which seemed more like advertisements than actual reviews but as a rule the reviews seemed like they were communicating opinions based on actually using the service.

4.1. Service experiences and contexts

In the online review content there was ample discussion about the service use experience containing especially descriptions of personal use cases, reasons for positive or negative use experience and information about the context of service use. Many reviews contained remarks about how the service is connected to the consumers' own value creation processes and other key resources providing a window to the daily reality of the consumer:

I've been using Storage as a means to transfer files from one computer to another and never thought how much time and effort it saved me. I store all my important images knowing that a catastrophe with my system doesn't mean losing years of priceless photographs and other important documents. Couldn't rate the service from Storage highly enough Brilliant. [Storage, online review #1]

Originally payed for the service so that my son could watch TV in his room from his xbox. App installed relatively simply and after initial problems getting it to work on the way the setup works in the parental control settings on the xbox, we were away. --- We frequently due to 'conflicts of interest' are watching three different things on various devices or TV's. [Streaming, online review #2]

Esp. in Streaming case, some reviews reflected on the service concept and how it was changing the everyday practices of consumers. The following example providing interesting insight on what the reviewer sees as the key sources of value from his personal perspective:

We love Streaming, it's so convenient, not having to drive to the video store, and the catalog is so much larger - every time we went to blockbuster, it takes 45 minutes of slowwwwly walkingggg arounnnndddd the place - but with Streaming we can easily choose all the favorites and create like a calendar of movies. And another pain with blockbuster was the merchandizing at the counter - geez they even sell those silly band things, 80 types of candy, t-shirts, breath mints...whatever they can make a buck on. This is not a rant against blockbuster, but I am really happy with Streaming. thank you.
[Streaming, online review #3]

Reviews also discussed various parts of the service use life cycle, including where one learned about the existence of the service, how did one end up trying it, what the purchase decision process was like and in the more critical cases why did one stop using the service or change to a competing supplier. There were also reviews which discussed use experiences and perceptions of the alternative solutions. This content included information about the perceived advantages and disadvantages in terms of price, technical features and service quality, as well as explicit discussion on the perceived positioning of the service. Reviewers' reflection on the competition was not limited to direct alternatives, but discussed also other types of services providing similar end results but with different means as well illustrated by the following review:

If you have it for 2 months its super easy to watch everything esp. when you have dish/cable. --- It almost seems like a Fox Movie Network on demand. Great if you don't have 500-600 channels on a dish/cable company. I will add, its killing our video/rental stores off. –
[Streaming, online review #4]

Content addressing quality of customer service included both unspecific praise and criticism, and more elaborate narratives on experiences dealing with the customer service. For example, several content customers were specifically thanking certain customer service workers for being nice and helpful. More critical reviews usually dealt with billing related problems and perceived mismatch between marketing material and the reality and company responses to such complaints. The narratives tended to be written in a rather personal manner, including information about the positive or negative emotions experienced during the process and reasons behind them.

4.2. Service quality and features

Usually explicit discussion of quality of service were limited to rather general level comments of liking or disliking the service, but some reviews did tie quality to certain features or other aspects of the service. When specific dimensions of service quality were discussed, most often mentioned issues by reviewers in both cases were technical reliability of service and ease of use. Consumers also commented extensively their views on the price/quality of the service. However, price/quality content as a whole was quite self-contradictory containing similar amounts of comments praising

and critiquing value for money. As a whole, reviews discussed a wide variety of matters from more broader topics like user interface, to more specific technical issues as in the examples below.

"Great service, but poor range of titles. The service Streaming provide is great - the site is easy to navigate, the movies stream really fast and the price is great. The only downside is that the range of title available is pretty small." [Streaming, online review #5]

Been searching for a new file host that can autoplay a hotlink SWF file on my folio site. Many say they can but then can't. Storage actually does it. [Storage, online review #2]

As said, certain features were also mentioned a lot more often than others. This phenomena was particularly strong in the Streaming case where the range of TV series and movies available for viewing in the streaming service was a theme of significant interest. This interest was also translated to more thorough reflection on the topic as illustrated by the following quote:

*Series: If you enjoy tv-series it is definitely worth to try if you are a series freak: it is best for tv-series you can watch all the seasons in high quality. Never had a problem with streaming. Always smooth and if you pause it next day it will start again from where you were.
Documentaries: it is quite ok with documentaries and "docutainment".
Movies: not the latest, best or blockbusters movies. IF you are cinema lover, might be worth to try other services, I hope they'll improve the database [Streaming, online review #6]*

These more elaborate pieces of analysis tended to contain implicit remarks about users' desires on how the service could be improved and developed as well as who the service currently suits best. Explicit development suggestions were made as well.

-- I would like to see instant service include dvd and blu ray extra features like making of and deleted scenes then we can do away with discs altogether. After all you main selling point is the alternative film viewing option from renting discs or buying them. Lets face it we get them for the extra features otherwise we would make the effort to see the film in the cinema. --- [Streaming, online review #7]

Such explicit suggestions as above were usually rather incremental and thus probably already recognized by the company. Many users were also suggesting very similar improvements. Therefore it seemed that main utility of analyzing ideas proposed by users would be to gain understanding about the amount of users yearning for a specific improvement, instead of actually gathering new ideas. Important thing to note is that such analysis should not be limited to examination of explicit suggestions solely because of the fact that majority of the reviews were communicating consumer needs and desires for improvement implicitly.

5. Discussion

Overall, the present study finds somewhat mixed evidence in terms of utilizing content from consumer reviews posted in online review sites in service innovation activity. The amount of distinct new ideas proposed in the reviews is rather low and those ideas which are presented are mainly incremental and likely to be already known to the company. Thus we contribute to the literature on open innovation (e.g. Bayus, 2013; Sigala, 2012; Ebner et al., 2009) by showing that public online review sites do not seem as a particularly suitable for virtual idea collection purposes in light of the present data, especially if the goal is to seek new radical ideas.

However, this does not imply that online review data is not meaningful in terms of service innovation activity in general. There were surprisingly elaborate analysis esp. in the Streaming data on who the services suit best and why as well as ample information related to the service experience, including various use cases, how the service brings value to customer, context of service use, causes for positive and negative service experience, perceptions of competing solutions etc. Gustaffsson et al. (2012) have argued that customer cocreation is not solely about understanding customers, but also their context of service use. The results suggests that analyzing online review data is one interesting lightweight method for providing an intriguing albeit small window to how, why and where consumers use the service in question. The findings bring new understanding to the discussion on methods for customer integration (Edvardsson et al., 2012; Magnusson et al., 2003; Alam, 2002) by showing the potential of online review site data in gaining insight on consumers' service use experiences and contexts. sa

The results also contribute to the literature on collecting and managing electronic word-of-mouth activity by highlighting issues in incentivizing consumers to voice their opinions online. According to Dellarocas (2003) it is important to motivate users to eWom activity to ensure high amounts of feedback. However, my results suggest that such approach might mean compromising review quality over quantity. While Storage received a much larger amount of feedback, the reviews were significantly less elaborate and informative, but contained more explicit recommendations and praise. Thus, based on our limited dataset, companies striving to increase positive eWom about their services should offer incentives for consumers voicing their opinions, but firms more interested in constructive feedback might be better off by refraining from doing so.

The results suggest that usefulness of online review data for development purposes can be highly context specific. It seems that even between similar types of offering and feedback gathered using the same technology, informativeness of reviews can vary significantly from case to case. Thus the main limitation of the study is the limited sample of two services from the same category of software-as-a-service solutions. More research using larger samples and cross offering and industry datasets are needed in order to make better generalizations about using public online review data in service innovation.

Several other interesting avenues for future research could be considered. As the scope of a single review was usually rather small, gaining holistic broader understanding of customer needs, value creation processes and use contexts required processing a notable mass of reviews. Also, there was large amounts of redundancy

especially in terms of some more popular themes in the reviews. Thus it seems that there is potential in increasing the efficiency of the processing of online review content. One interesting topic for further research could be methods for using automated content analysis to identify those reviews which are less generic in terms of discussed themes and should be examined more in detail. Such approach could decrease processing of redundant content without notably losing richness in end results. Another intriguing topic for further research could be utilizing non-text based consumer generated content for service innovation purposes. The present study is an example of analysis of text-based content, which has received majority of attention in studies of user generated content (see Lu and Stepchenkova, 2015). With the raise of digital services like Instagram², which enable sharing of photographs, videos and other visual content, consumers are increasingly voluntarily providing a visual window to their daily activity. Such data could be highly interesting in terms of service innovation especially for increasing understanding about service use contexts. Research on whether such data could be utilized in service innovation and practical as well as ethical challenges related to doing so would be highly valuable.

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XXV. International RESER Conference: ICT-based service encounters as an innovation arena

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The digitalization of services has been increasing during the recent years and thus there is a call for service innovations, particularly in the finance and insurance industry. The research on service encounters is shifting towards examining ICT-based service encounters, which is a greatly under-researched area. This paper examines ICT-based service encounters as an arena for continuous innovation. It elaborates the existing categorisation of ICT-based service encounters and examines the ICT-based face-to-face encounters from the perspective of value expectations of different actors and alternative innovation logics. By providing preliminary empirical illustrations this paper contributes to bridging the research gap between theory and empirical evidence.

1. INTRODUCTION

It has long been acknowledged that ICT plays an increasingly important role in service innovation, and that, with other resources enabling the rebundling and transfer of information in different contexts, it creates new opportunities for service exchange and innovation (Vargo & Lusch, 2004, 2008a, 2008b; Lusch and Vargo, 2014). More often nowadays, the service itself is ICT-based, for example in e-services. This is particularly evident in the banking and insurance industry, where the focus is increasingly shifting towards service- and customer-orientation enabled by digitalisation (cf. Vargo & Lusch 2008; Lusch & Nambisan 2015). According to this view, customers are considered to be active key resources, and thus service encounters are put to the core not only of daily value co-creation but also of innovations when seeking new means for differentiation (e.g. Edvardsson et al 2012). A great deal of research has focused on studies on service encounters, particularly in service management and marketing research as well as recently service innovation studies (e.g. Bitner et al., 1990; Payne et al. 2008; 2009; Sørensen et al 2013; Sundbo et al. 2015).

In the service encounter, and particularly in innovations stemming from this encounter, frontline employees have a key role. Recently, service encounter-based innovation has been defined as *innovation which is developed from the ideas, knowledge, or practices stemming from frontline service employees' interaction with users during the service delivery process* (Sørensen and Jensen, 2012; Sundbo et al., 2015).

Some contributions have been made in the recent years to the service encounter-based innovation, and particularly the role of front line employees in service development, (Fuglsang & Sørensen, 2011; Sørensen et al, 2013; Sundbo et al., 2015; Engen & Magnusson, 2015). Also, the organizational conditions have been researched for service encounter-based innovation and the competences service employees require in discovering and communicating customer input (Sørensen et al., 2013; Sundbo et al., 2015).

However, the service encounters in which ICT is utilised not only in value co-creation and related interaction but also to acquire ideas for service innovation have not yet been much studied (cf.; Henten 2012; Sørensen & Henten, 2014; Sundbo et al., 2015). Consequently, ICT-based service encounters are increasingly gaining research interest. In their recent studies, Henten (2012) and Sørensen and Henten (2014) investigate *theoretically* the ICT-based service encounters from an innovation condition perspective by exploring service innovation, media and communication as well as human computer interaction (HCI) studies. Their exploration reveals the variety of ICT-based encounters depending on the ICT tools as the mediator. This interesting review provides an ideal basis for further examination. Sørensen and Henten (2014, 76) suggest, for example, that ICT services have both elements of goods dominant logic and service-dominant logic, potentially making them less sensitive to innovation in a service encounter. However, due to the lack of empirical evidence on how innovation is induced in ICT-based service encounters (Henten 2012; Sørensen & Henten, 2014), we claim that there is still a need to further investigate the forms of ICT-based service encounters and their potential for innovation. In this paper, we attempt to fill this research gap. Nevertheless, due to ongoing empirical case studies and thus tentative empirical illustrations, our paper is more conceptual in nature. Our empirical context is in the insurance industry where, as in many other industries, digitalization is increasing rapidly. In our case study, we examine a large Finnish networked insurance company, where both the service mindset and digitalization is highly topical.

In our paper, we will focus on examining the ICT-based service encounters *as an arena* for (service) innovations. We have thus set the following research questions considering ICT-based service encounters as an innovation arena to enhance value co-creation and co-innovation:

- What type of value expectations do different actors have of ICT-based F2F service encounters?
- What kind of innovation logics occur for utilising ICT-based F2F service encounters?

The paper is structured as follows. In the second section, we discuss the theoretical frameworks that form the starting point in our study. Firstly, we consider it necessary to elaborate the categorisation suggested by Henten (2012) on the basis of our empirical study. In our examination, we realized that one type of ICT-based encounter is missing: the ICT-based face-to-face encounter, where interaction is enabled via ICT, more precisely meetings between service employees and customers that occur via video conference tools. The elaboration is required, as this missing type of ICT-based service encounter is at the centre of our empirical focus, and from a managerial perspective highly topical, particularly in the finance and insurance branch. *Secondly*, we utilize the principals of service-dominant logic (later S-D logic) in value co-creation and innovation (Vargo & Lusch, 2008; Lusch & Nambisan 2015). When

studying these specific ICT-based service encounters *as an arena* for (service) innovations, we highlight an understanding of value expectations and value in use for beneficiaries, such as customers and other actors, like front-line employees and managers. (e.g. Rintamäki et al. 2007; Payne & Frow, 2014; Edvardsson et al. 2012; Yuan et al. 2014). Thirdly, we also examine the top-down directed and bottom-up experimental innovation logics in *ICT-based* service encounter based innovation (Sørensen et al. 2013; Toivonen 2010; Saari et al. 2015; Kallio et al. 2013). The third section presents the design of our research and the empirical case context. The fourth section summarizes the tentative results, and in the final section we present our concluding remarks and suggestions for further research.

2. THEORETICAL BACKGROUND

2.1. From service encounters towards ICT-based service encounters

There is a great deal of research into service encounters, particularly in service management, marketing and relationship marketing traditions. The focus has been on customer satisfaction and loyalty (Czepiel, 1990; Bitner et al., 2000; Massad et al., 2006), but there is also some research into service encounters from the perspective of value co-creation and the design of service encounters (e.g. Payne et al. 2008; 2009). Payne et al. (2008) suggest that three broad forms of encounters facilitate value co-creation; 1) communication encounters, which are primarily carried out in order to connect with customers, and promote and enact dialogue (e.g. through advertisements, brochures, internet home-pages and manuals); 2) usage encounters which relate to customer practices in using a product or service and include the services which support such usage (e.g., using an internet banking service) and 3) service encounters that are customer interactions with customer service personnel or service applications (e.g., via a contact centre). In this paper, we focus on the third form, which Sundbo et al. (2015) further define as a meeting between the producers of a service and its users at the different touchpoints of the marketing, negotiation, delivery and after service processes. In their view, this encounter is crucial in terms of the service experienced by the customer as well as the service company's user-based innovation. The role of frontline employees is highlighted, as they are the people who interact with the customer in the service process.

Sundbo et al. (2015) consider the service encounter from the innovation perspective, and examine how innovation stems from the encounters between employees and customers. The role of employees and customers is crucial in this type of innovation, which bridges it to user-driven innovation (UDI) and employee-driven innovation (EDI) traditions. Nevertheless, Sundbo et al., (2015) differentiated encounter-based innovation from EDI and UDI, as the focus is on the interaction between the employee and user. In order to understand innovations stemming from encounters between employees and customers, Sundbo et al. (2015) suggest the term co-innovation should be used, which can be defined as "innovation in encounters between employ-

ees and customers in services” (Sundbo et al., 2015; Yenyurt, Henke & Yalcinkaya, 2014). Further they see the employees in playing the main role (Sundbo et al., 2015).

Though the research into service encounters and encounter-based innovation is quite significant, little research has been carried out into technology-based service encounters. More often nowadays, services include some ICT-based elements due to digitalization. Henten (2012) and Sørensen and Henten (2014) have studied the ICT-based service encounters from a theoretical point of view. Sørensen and Henten (2014) suggest that, when a service encounter is mediated via ICT, the conditions for co-innovations also change, hence, the innovation potential in the ICT-based service encounter differs from that of traditional face-to-face encounters. Henten (2012) has suggested a framework of three main modes so as to categorize the variety of ICT-based service encounters. Due to the lack of research on ICT-based service encounters, this categorization remains quite vague, which is why we elaborate the modes with the help of examples from the insurance industry, which is our case context in this paper.

The first of Henten’s (2012) categories is *face-to-face service encounter with ICT-enabled interaction between employees and customers*. By this, he refers to the marketing, contacting, ordering, payment and feedback phases of service processes. In this mode, the ICT is considered “circumstantial” to the core service. We further characterise these as meetings that occur face-to-face in a physical location, and where ICT is used as a tool in service exchange, but the company and the customer are both physically present, i.e. the interaction occurs simultaneously. In the insurance context, this could, for example, be unscheduled or pre-scheduled meetings between customers and employees in branch offices regarding the purchasing of insurance services.

The second of Henten’s (2012) categories is *ICT-based service encounter with ICT-enabled interaction between employees and customers*. In this category, the ICT forms the core of the service as, for example, in e-banking. These kinds of services include data, information and knowledge of the customer, which is entered in digital media and transported on communication networks. We specify this mode as interaction that occurs *only* via ICT-enabled tools, and where the presence of service provider is electronic/virtual. Interaction may occur simultaneously or with a time delay, depending on the means of communication. In the insurance services, this could be the customer service phone line, chat, e-mail or online contact sheets.

The third category is *ICT-based service encounters in which customers are a key part of creating the service*. The content of the service is created by the users of the service, though the platform for the service is under the control of the service provider, for example, Facebook or YouTube. In that sense in the insurance industry, this category has its limitations regarding the dominant customer role due to the legislative and regulatory nature of the service. Though following the S-D logic (e.g. Vargo and Lusch 2008), it could be argued that the value of the service is always co-created by the service organization and customer, something which we discuss in greater detail in Chapter 2.2.

Reflecting the Henten categories in our case context, we notice that an important mode of ICT-based service encounters is missing. Thus, we would like to bring forth a fourth form: *ICT-based face-to-face service encounters with ICT-based custom-*

er/employee interaction. In this mode, interaction between customer and service employee occurs face-to-face via ICT-tools, such as video conferencing. The company representative and customer are virtually present and are able to see each other, thus enabling simultaneous and reciprocal interaction in the service exchange. What differentiates this mode from the first one is that it enables location independence, as the customer can interact face-to-face with the front line employee, for example, from home. We also differentiate this mode from the third one on the basis that, although provided entirely using ICT, this suggested fourth mode enables face-to-face interaction via video, which changes the nature of the service exchange and innovation potential discussed in the chapters following. There are also no time delays in the interaction, as there can be in e-mails or calls to the customer service phone lines. An example of this mode in the insurance industry can be unscheduled or pre-scheduled video conference meetings between customers and employees via ICT tools (computers, tablets or smartphones). All of these modes are presented in Table 1, in which we have placed the new mode between the first and second modes suggested by Henten (2012).

Modes of ICT-based service encounters (Henten, 2012)	Description	Examples from the insurance industry
1) Face-to-face service encounter with ICT-enabled interaction between employees and customers	Meetings that occur face-to-face in a physical location. ICT is used as a tool in service exchange, but the company and the customer are both physically present. Interaction occurs simultaneously.	Unscheduled or scheduled meetings between customers and employees in branch offices
2) ICT-based face-to-face service encounter with ICT-enabled interaction between employees and customers	Meetings at which face-to-face interaction is enabled by ICT, and ICT is used as a tool for the service exchange, the company representative and customer are virtually present, but can see each other via video. Interaction occurs simultaneously and reciprocally.	Unscheduled or scheduled video conference meetings between customers and employees via ICT (computers, tablets or smartphones)
3) ICT-based service encounter with ICT-enabled interaction between employees and customers	Interaction that occurs only via ICT-enabled tools, presence of service provider is electronic/virtual Interaction may occur simultaneously or with a time delay, depending on the means of communication (chat, e-mail)	Customer service phone line, chat, e-mail, online contact sheets
4) ICT-based service encounter where customers are a part of creating the service	Customers play the main role in service exchange while the company only provides ICT-based service platforms.	Rather limited in the insurance industry; however, relevant from innovation perspective.

Table 1. Elaborated categorization of ICT-based service encounters (modified from Henten, 2012)

In this paper, we will not examine all of the modes in detail, but focus on the ICT-based F2F service encounters with ICT-based customer/employee interaction that we brought forth.

2.2. Identifying value in use, value expectations and innovation potential enhanced via ICT-based F2F service encounters

As presented in the introduction, we consider it relevant to explore more the conclusion of Sørensen & Henten (2015, 76) that: *ICT services have both elements of goods-dominant logic and service-dominant logic, potentially making them less sensitive to innovation in the service encounter*. They ended their exploration of ICT-based services (consisting of various ICT-based service encounters), by stating that the most important criterion is that, while services are defined as having inseparable consumption (simultaneousness of production and consumption), goods as well as e-services are regarded as having separable consumption. From that point of view, ICT-based services (e-services) possess some of the same characteristics as goods, while maintaining some of the characteristics of services (cf. Calborg et al. 2014). Thus ICT-based services are something 'in between', which contributes to the innovations deriving from the service encounters in ICT-based services. (Sørensen & Henten 2015, 67.) Furthermore, by referring to the argumentation of Vargo and Lusch (2006) that goods-dominant and service-dominant logic are combined in various ways and with different emphases in daily economic and social exchange, Sørensen and Henten (2014) concluded that ICT-based services/service encounters have a strong element of goods-dominant logic.

However, due to the great variety of ICT-based service encounters with assumed differences in their innovation potential, we explore more the specific form of ICT-based F2F service encounters (defined in Chapter 2.1) from a service-dominant logic (later S-D logic) perspective by stressing the innovation potential. Firstly, according to S-D logic, *the Service* is defined as the mediating factor in the *reciprocal process of value creation*, while single "services" and "products", (such as insurance products, finance and ICT tools), are seen as *vehicles or distribution mechanisms* for service provision (Vargo & Lusch 2008). Thus, service can be provided directly or through a good, but it is the common denominator of social and economic exchange (Vargo and Akaka 2009). Moreover, service is seen as the *application of operant resources (knowledge and skills) for benefit of another*, being the basis for all exchange (Ibid.), which characterized also strongly knowledge-centric insurance industry.

Secondly, the fundamental premises of S-D logic state that value is always co-created with beneficiaries, and therefore the *customer is always a co-creator of value* (Vargo & Lusch 2008). Consequently, the firm cannot provide value, but only offer value propositions (Ibid.). Thus, customers are seen to play an active role not only in service exchange, but also in the innovation activity. Service innovation is defined as complex network- and information-centric value co-creation by rebundling of diverse resources that create novel resources that are beneficial (i.e. value experiencing) to some actors in a given context (Lusch & Nambisan 2015, 162). Thus, collaborative innovation is embedded in the everyday service exchange among different actors, including beneficiaries such as customers. This definition is aligned with recent studies of collaborative service innovation and service encounter research from both an innovation and value creation perspective (e.g. Payne et al. 2008; 2009; Sørensen et al 2013; Sundbo et al 2015).

Therefore, it is crucial to create *supportive environments* for resource integration and value co-creation in novel ways, such as in our case by means of ICT-based F2F service encounters. Accordingly, we see that ICT-based F2F service encounters via video connection provide flexible mechanisms that facilitate reciprocal interactions

between actors and enhance the transparency of activities in an increasingly complex and networked knowledge-intensive branch such as insurance. According to Sørensen and Henten (2014), the critical for innovation potential is the degree of formalisation of the communication, and they thus conclude that ICT-based encounters provide narrower opportunities for innovation. However, we suggest that ICT-based F2F service encounters via video connection enable reciprocal and rather informal interaction for knowledge sharing in the verbal, textual or visual forms between front line employees and customers, as well as related evaluation and negotiating. From the S-D logic perspective that is resource integration and re-bundling so as to enhance service exchange and also the potential for novel ideas for innovations.

Fourthly, S-D logic argues that the use context and contextual experience are essential in value co-creation: *value is always uniquely and phenomenological determined by the beneficiary* (Vargo & Lusch 2008). The role of the provider is to offer input and support the customers' activities, but the customer determines what is of value in their own context. Recently, Chandler and Vargo (2011) have used the term "value-in-context" to describe this phenomenon. Therefore, *understanding value in use* for the beneficiaries, such as customers and other actors involved, is crucial for competitiveness and the differentiation of companies. Concerning our case, we may assume that ICT-based F2F service encounters via a video connection support value co-creation in a more flexible manner in terms of time and place independence. That enables a *need-basis service in the use context of insurance service*, such as at home, when customers have suitable time to resolve these issues, a health care centre or even accident sites. Furthermore, we suggest that these kinds of encounters may also enhance novel idea generation when they occur closer to the use context, that is, when value is realized and experienced by customers and other beneficiaries. Edvardsson et al. (2012) have pointed out the understanding of customer value in use by two dimensions: in situ or ex-situ related to customer involvement, and context or ex-context, which concerns a resource constellation available for customers to enable value co-creation. We discuss more about the topic in the next chapter.

S-D logic also makes the difference between value co-creation and co-production, which has been a common observation among service researchers (Kallio & Lapalainen 2014; cf. Sørensen & Henten 2014). Co-production refers to the customer's participation in the creation of the value proposition (the firm's offering), which is optional and depends on the conditions of the provider and the customer (Vargo and Akaka 2009). As stated, in order to create competitive value propositions, it is crucial to understand the *value expectations and needs* of the customers and other beneficiaries. Vargo and Lusch (2004) have highlighted the interactive, relativistic, and experiential nature of customer value. Rintamäki et al. (2006, 624) concluded their literature review on *customer value* by stating that: *customer value (or rather value in use) is always defined by customers' subjective perceptions and evaluations of the total customer experience. Customer value proposition hence is an encapsulation of a strategic management decision on what the company believes its customers value the most and what it is able to deliver in a way that gives it competitive advantage*. Furthermore, they conclude that a customer value proposition should: 1) increase the benefits and/or reduce the sacrifices that the customer perceives as relevant; 2) build on competencies and resources that the company is able to utilize and develop, 3) be recognizably different (unique) from competition; and 4) result in competitive advantage (Rintamäki et al. 2006, 624).

In order to examine the value expectation of customers (and other beneficiaries) towards ICT-based F2F service encounters via a video connection to enhance value co-creation and co-innovation, we found their four hierarchical dimensions of customer value to be relevant. It starts from *economic and functional*, and moving towards *emotional and symbolic value*. Moreover, they present the framework, where the value dimensions are hierarchically structured in the form of a customer value matrix. The value dimensions range hierarchically from more objective to more subjective, from more concrete to more abstract, from more utilitarian to more hedonic/psychic, and from more transaction-based to more interaction-based. As it becomes obvious, the customer's role as value-creator increases from economic towards symbolic values, also reflecting better means for differentiation from the company perspective. Furthermore, as they pointed out, customers may not experience value in a hierarchical manner, even though the value proposition is typically constructed of several values. However, from the point of view of the company's competitive advantage it is essential to identify a point of difference. That is, whether focusing on price and economies of scale, solutions, customer experience or meaning. (Rintamäki et al. 2007.) The latter ones call for deep customer understanding as well as interest and competences for co-innovation from both beneficiaries, companies and customers.

While this value hierarchy helps in identifying critical customer value to construct tempting and competitive value propositions, some other frameworks may be called for in order to identify value expectations of other beneficiaries or stakeholders, as suggested by Frow and Payne (2011). They provide a broader view of value through the creation of value propositions for key stakeholders, although not exploring value dimensions in more detail. Instead, Yuan et al (2014) in their article, considering a resource mapping framework for value co-creation in social media, differentiate three main value dimensions relevant for all beneficiaries, such as *Beneficial value*, *Knowledge value*, *Social capital value*. By the concept of beneficial value, they refer to Vargo et al (2008, 148) who defined "*the adaptability and survivability of the beneficiary system*" as the core and main measurement of value in S-D logic. It remains rather vague, implying the contextuality, and may also include the knowledge and social capital values. Furthermore, they highlight that value-in-exchange is the negotiated measurement provided and obtained (e.g. money and value proposition) among exchange partners. Therefore, it serves a means of measuring relative value within a context of surrounding systems, such as competitors. As they specify, *the process of co-creating value is driven by value in use, but mediated and monitored by value-in-exchange*. (Vargo et al. 2008, 150.) ***In this paper, we focus on examining the value expectations of different actors, while our empirical cases are at the experimental stage on service innovation.***

When moving towards a service approach, new kinds of coordination mechanisms are called for, such as co-constructing a *common (service) mindset* and *architecture of participation*, suggested by Lusch and Nambisan (2015) among others. In their article, Lusch and Nambisan (2015) suggest that ICT fosters service innovation through the establishment of a value network, and allows the sharing and integrating of resources and knowledge within that network. We propose that *ICT-based F2F service encounters can be applied in this manner as arenas for collaborative innovation*. In addition, strategic coordination and systemic support are necessities due to network- and knowledge-centricity within and between (organizational) actors. In the

next chapter we focus on alternative innovation logics relevant when utilizing ICT-based F2F service encounters via video as an innovation arena.

2.3. Innovation logics in service encounter-based innovation processes

In the concept of encounter-based innovation, Sørensen et al. (2013) highlight the daily service encounters as an innovation arena, and both employees and customers as active innovators. As a basis of encounter-based innovation, Sørensen et al. (2013) suggest two different innovation logics; directed (top- down) and practice-based (bottom-up). Alternative innovation logics have been studied respectively by Toivonen, (2010) and Kallio et al. (2013) in knowledge intensive services among others. However, these innovation logics have not yet been researched much in the context of ICT-based service encounters (Henten, 2012; Sundbo et al., 2015). The directed (top-down) innovation logic has the same characteristics to that of a stage-gate approach in terms of formal structure. In stage-gate approach the innovation process is organized in certain phases: 1) the emergence of an idea at the fuzzy front end; 2) the development of the idea; and 3) the application of the idea to the markets and customers (de Jong and Vermeulen, 2003). In directed innovation, the ideas emerge in the service encounter, but only managers have the resources to bring the input into the development processes (Sørensen et al., 2013). The stage-gate approach to innovation with reliance on its pre-planning, linear process structure, top-down and provider-centric nature has been considered particularly problematical with service innovation due to its interactive and knowledge intensive nature. The provider-centric nature of this innovation logic has been criticised, particularly in service exchange where close contacts with customers are essential. Also, the order of innovation process phases can vary, as innovation can start from a change in practice, instead of from a specific, recognized idea (Toivonen, 2010).

It is also argued that innovation can occur as practise-based change processes, where employees make small, unintentional changes in their daily service process. However, the innovation potential of the practise-based changes has been ignored in many service organizations (Sørensen et al., 2013). The practise-based changes are of a similar nature to so-called rapid experimenting processes that have emerged as alternatives to linear stage gate models; they aim at testing the emerged idea immediately with customers. If the idea receives approval, it is developed further, and in this way the innovation activities are integrated into service practice and co-development with users (Toivonen, 2010; Heinonen et al., 2010). Co-innovation is characterized by dynamic interaction among different interest groups or individuals occurring in practice through concrete and collaborative experimenting, experience and renewal (Kallio et al., 2013). Employee-driven innovation (EDI) is in the core of practise-based bottom-up innovation logic, as it emphasises the initiatives of employees in bringing forward their ideas arising from the interaction within service encounters. Also, the term bricolage is important in EDI literature as it is the process of co-shaping an emerging path through a continuous learning cycle, where competences are developed by learning by doing and through interaction (Saari et al., 2015). The roles of employees in innovation activities has been studied from the innovative behaviour perspective (Tuominen & Toivonen, 2011). Innovative work behaviour is considered to be one type of extra-role behaviour, meaning that it is not expected of employees, but generating new ideas and sharing them within the organisation is

encouraged. In-role work behaviours, on the other hand there are activities that are expected from an employee in a certain organisational role (Merton, 1957; Katz and Kahn, 1978). Although innovative behaviours might not be formally required, these actions are important for the survival of organisations (Tuominen & Toivonen, 2011).

The needs of customers are highlighted in employee-driven innovation, as the problem-solving takes place in the interaction with customers. Regarding customer integration to the service development within these innovation logics, Edvardsson et al. (2012) have suggested that it is essential to capture information on value in use in the terms of context and situ in order to understand customers and the aspects of value co-creation that are critical to them. In their novel framework, customer data (and data collection methods) are firstly classified either as in situ (data captured in a customer's use situation) or ex-situ (data captured outside the use situation). Secondly, data is categorized as either in context or ex-context, which concerns a resource constellation available for customers to enable value co-creation (ibid.). Within this framework, Edvardsson et al. (2012) further present four roles for customers to be involved in service development: 1) *the correspondent-role*, where the customer is in a value-creating situation, has experience of the service context and where information can be gathered from a real life service situation; 2) *the tester-role*, where the customer has knowledge of the service context outside and can test the service in simulation of the real life service; 3) *the reflective practitioner-role*, where the customers has experience from the service context, but is not in a real life service situation; 4) *the dreamer-role*, where the customer has learned about the service context from outside, but is not connected to a real-life value-creating situation.

To implement the practise-based improvements and ideas of employees emerging from interaction with customers, management has to support, recognize and organise the bottom-up processes (Hoyrup, 2010). We argue that this is even more crucial in ICT-based services, as when the encounter is mediated via ICT, important properties of the service change (Sørensen & Henten, 2014). Sundbo (1996) has suggested that innovative service organisations consist of a dual structure; an informal social system that produces ideas and a management system that supports the personnel and selects the ideas to be developed.

To summarize, the service encounters thus provide a dynamic interactive arena for innovations in terms of challenging the current way of carrying out and modifying service activities iteratively by experimenting, reflecting, and developing further the ideas stemming from the encounter between customers and frontline employees. It is important to consider relevancy of these alternative innovation logics also in ICT-based service encounters, where ICT does not only change the nature of the service exchange, but the nature of interaction and of work of frontline employees.

3. THE RESEARCH DESIGN OF THE CASE STUDY

We specify our research questions considering ICT-based F2F service encounters as an innovation arena to enhance value co-creation and co-innovation as follows:

- What type of value expectations do different actors have of ICT-based F2F service encounters?
- What kind of innovation logic occurs for utilising ICT-based F2F service encounters?

In order to answer these questions empirically, we found a qualitative case study approach relevant to our study due to its explorative nature (see e.g. Yin 2008; Eisenhardt 1989). We study the innovation activities of a large Finnish insurance company, which consists of a network of 19 regional insurance companies, located all around Finland. Our case company is dealing with the comprehensive changes going on in the insurance industry regarding value creation and innovation logic with a growing emphasis on digitalization. The increasingly tight competition has boosted not only the digitalization trend, but also a search for novel business and growth opportunities. In recent years the company has invested a great deal in a transformation towards stronger service and customer orientation. The company operates both in B2B and B2C markets, the latter being our research target in this paper, but still keeping in mind synergies between them (for further research). In the case of consumers, the service offering of the company already consists of a variety of ICT-enabled service encounters, from telephone consultation to online services. However, a paradigmatic change in the company's innovation logic has boosted different kinds of *novel experiments* in the service development enabled by digitalization.

For our paper, we have chosen a mini case of this kind, which focuses on ICT-based F2F service encounters, via video connection. The mini case is thus aimed at developing the new type of service channel to enable the customers an alternative way for service exchange with the service personnel as regards insurance matters. The video connection enables visual, immediate and reciprocal interaction with a service person. Consequently the needs of the customers to visit the branch office will be reduced. The purpose is to provide "remote locality"; giving the customer the sense of a person-to-person service, but with more flexibility as regards their own location. The ICT-application is designed for two interfaces; a remote "digi-corner" (resembling an old phone booth) with a video screen, which can be located, for example, in shopping centres or grocery shops; and a mobile application enabling a video connection, which can be downloaded into a smart phone or a tablet. The application is developed in collaboration with an external IT-company.

The development work of the mini case is located in one of the 19 regional companies within the entire company group. It was originated by the proactive and visionary management of the regional company, which operates in 14 localities in the western part of Finland and has a bit over one hundred employees. Within the company group the regional company currently ranks somewhere in the middle in terms of revenue, and is in the top three with their growth rate. The development work started at the end of year 2014, and is currently moving towards experimentation with customers.

As a method, we utilize semi-structured thematic interviews. They were targeted to the managing director of the regional company in charge of the mini case and the representatives of management of centralised service development in the company group. Altogether, four interviews were conducted and analysed in May – June 2015. Each interview took approximately one and half hours and was conducted by two researchers so as to ensure coherency of the interpretations. In addition to memos from the discussions, all interviews were recorded and later transcribed. The qualitative analysis was conducted based on our two research question and the main conceptual frameworks presented in Chapter two. Value expectations of actors of ICT-based F2F service en-counters (via video connection) were analysed by following S-D logic approach (e.g. Vargo & Lusch 2008; Vargo & Akaka 2009) and based on value dimensions defined by Yuan et al (2014), Vargo et al. (2008) and Rintamäki et al (2006). Characteristics of alternative innovation logics which occur for utilising ICT-based F2F service encounters were examined according to concepts of Sørensen et al (2013), Tuominen and Toivonen (2011) and Edvardsson et al. (2012).

4. MAIN FINDINGS

4.1. Value expectations of actors of ICT-based F2F service encounters (via video connection)

Based on our first research question, we summarize our main tentative findings regarding the value expectations of different actors of ICT-based F2F service encounters via video connection. These encounters are supposed to enhance value co-creation and co-innovation. As different actors we identified the managing director of the regional company in question (later regional manager), front line employees, the representatives of centralized service development, external partners and customers (in B2C market).

In the interview with the regional manager, he raised the rethinking and renewing of their means of differentiation such as locality and customer proximity in the digitalized world as the key value expectation, which also seems to be the driving force in their development work in question. Primarily it is justified by changing customer needs and value expectations. Consequently they call for novel ways for organizing and developing resources in the long run, while having a geographically wide market area to serve with diminishing resources (competent employees and small offices). Therefore, the primary value expectation strongly reflects the so-called **beneficial value** defined as “adaptability and survivability of the beneficiary system” by Vargo et al (2008).

According to the regional manager, regarding simple insurance issues *customer value* focuses strongly on promptness. The more specific customer value expectations were only in the basis of rough ideas, such as that in IT-based F2F service encounters via a video connection customers *seem* to value the flexibility related to time and location dependence as well as material sharing in multiple forms to facilitate negotiation and decision-making activities. Furthermore, personal, F2F interaction and resource integration is particularly valued regarding the more complex personal risk insurances. These deeply concern taking care of personal well-being, and/or the well-being of family and other communities (such as companies). Thus, they are de-

rived from fundamental human needs such as a feeling of security, and even continuous renewal (in terms of new programmes towards a healthier life style with various impacts). Here, even virtual F2F service encounters are still seen to have certain limits from the regional manager and customer viewpoints.

By applying the customer value hierarchy developed by Rintamäki et al. (2007) the former can be interpreted as **functional** value and the latter as **emotional** or even **symbolic** value. This seems rather obvious, and also reflects a general shift from tangible towards increasingly intangible, or operand resources, as the core in value co-creation, aligned by S-D logic too (e.g. Vargo et al. 2009). As the regional manager crystallized, that customers wanted to be “in the swim”, which may be linked to functional value, or even *symbolic value in terms of identifying with so-called pioneers*. Moreover, the *possibility of collaborative innovation can be interpreted as symbolic value*, which reflects strongly the chosen experimental innovation approach in their development work. In addition to these customer value expectations highlighted by the customers themselves, the regional manager himself refers to emotional value when describing special features of ICT-based F2F service encounter, such as privacy needs and “look and feel” issues.

When turning back to the value expectations of the regional manager himself, understanding value in use for customers by taking them as an active part of collaborative innovation can be interpreted as **Knowledge value** which he stressed. This is discussed in greater detail in the next chapter. However, the regional manager emphasized two strategic partnerships, from which another one related to deepening the customer understanding; the students from the local university as an external facilitator and co-learners. The other he mentioned was the IT-provider of resources related to video connection. He described their mutual interests in being pioneers in developing novel ways and alternatives for service encounters to enhance value co-creation and co-innovation in the insurance branch. This could be interpreted as **beneficial value in a systemic sense**, but also stresses the expectation of **social capacity value**.

The value expectations of the front line employees (based on the interview with the regional manager) focused on **beneficial value**. That is manifested by their willingness to be involved in innovation activities by experimenting and co-constructing the value creation activities with customers. This can be interpreted as understanding the necessity of renewability and adaptability in order to enhance the competitiveness of all beneficiaries (personal and company). In that sense, the **Knowledge value** is highlighted such as learning and competence building.

The value expectations of the representatives of centralized service development of the company group of ICT-based F2F service encounters via a video connection were rather limited, because they had conducted the local development work rather independently. According to the regional manager, novelties with scalability potential were expected and supported by providing company-specific guidelines and knowledge. The systemic approach and strengthening service mindset combined with the digitalization approach were also strongly highlighted in the interviews with representatives of centralized service development. Thus, they altogether refer to strong and shared acknowledgement of the fundamental **beneficial value**, as well as **Knowledge value (built-in) in terms of capability building and mutual learning competitively in the systemic sense**. In addition, when regarding so called value in exchange (Vargo et al 2008), both the regional manager and the representatives of

centralized service development shared the same expectations focused on growth targets, such as great increase in sales concerning current and new customers and thus revenue in an increased profitable manner.

4.2. Innovation logics in developing ICT-based service encounters

The changing needs of customers, the pressure to differentiate in the markets and staying on top of the increasing digitalization of service exchange were highlighted in our case study as drivers of innovation. Our interviewees discussed that there is still a need to serve customers locally, however, the digitalization trend calls for new ways of interacting. This is the challenge that is pursued to be tackled in our mini-case: how to be locally present in the digital world. The development of new solutions was started after the management of the regional company decided to follow the digitalization trend in the industry, and develop something new by themselves, rather than waiting for well-planned guidelines from the strategic management of the company group (Toivonen, 2010; Heinonen et al., 2010). In our interviews, the development processes of the strategic management were described as slow and heavy, which is why the regional management decided to pursue with a “do it yourself”– approach, which can also be described as bricolage (see Fuglsang, 2010). Though the development was started without the formal agreement with the top management, they have been notified about the development goals and related investments. From the perspective of the entire company group, the impulse for the development can be said to originate from bottom-up. Still, the development cannot be described strictly as practise-based, where small, unintentional changes are made by front-line employees to improve the service processes (Sørensen et al., 2013). Instead, the vision (based on value expectations presented in Chapter 4.1.) and the main concrete development steps are based on strategic alignments within the regional company.

The development approach in the mini-case is to go bravely and quickly to the customers so as to gain feedback and ideas to develop the service further (see e.g. Toivonen, 2010). The nature of the development is thus *experimental*, and the focus is on continuous learning from experiences in the service encounter. The role of both employees and customers is thus highlighted in the innovation activities. In the mini-case, the employees have been activated to present their ideas in developing the digi-corner and mobile video conference application. So-called “lead-user employees” are named to test the new solutions in practise together with customers. In their encounter with the customer, they receive valuable knowledge and feedback on how the customer experiences the ICT-based F2F service encounter. From an innovative behaviour perspective (Tuominen & Toivonen, 2011), the employees can be said to have an *expected in-role* in the development, as resources are allocated for them to develop the service, unlike in directed innovation, where only managers usually have the resources to do this (Sørensen et al., 2013). This role is in line with employee-driven innovation (EDI) as the emphasis is on the initiatives of employees in bringing ideas arising from the service encounters forward through a continuous learning cycle (Saari et al., 2015). To experiment with the digi-corner, a pilot version of it will be placed in a local grocery shop, close to a branch office. The role of employees is important in the experimentation of the digi-corner, as they have to encourage existing customers to try it out.

It is also critical to gather customer information on the *value in use* to understand the aspects of value co-creation that are critical to customers (Edvardsson et al., 2012).

Just in the beginning of the development work, an understanding of the customer needs regarding digitalization and novel ICT based F2F service encounters in insurance branch were gathered with the help of the students during a management course in the local university. Customers have thus been engaged in a *dreamer-role*, where they have learned about the service context from outside, but are not connected to a real-life value-creating situation. When needed ICT applications have been developed with IT-partner, the customers are given a possibility to out the digi-corner in dealing with insurance related issues, as an alternative to a traditional face-to-face encounter. In this experimentation, the customers have a *correspondent-role* as they have experience of the service context, enter a real-life value-creating service situation from which information can be gathered. Further, to test the mobile video conference application developed, students from the local university have been employed to market the new service to people in various events with iPads, to ask people their opinions about the service in use. With the iPad, it is possible to make a test connection with an employee of the company to see how it would work in practice. The students gather data from the customers so that it can be utilized in further development. In this situation, the customer's act in a *tester-role*, as they learn about the service from outside its actual context, but test the service in a simulated use situation (Edvardsson et al., 2012). Essential is to note that multiform customer and employee involvement, defined here as the collaborative innovation, not only have contributed to ICT based F2F service encounters as such, but also to entire service system (cf. e.g. Lusch & Nambisan 2015).

Our tentative interpretations of our empirical results regarding the innovation logic in the development of the ICT-based F2F service encounters are summarized in Table 2.

Dimensions	CASE STUDY: Development of a "Digi-corner" and a video conferencing mobile application for insurance services
Characteristics of the ICT-based service (encounter)	ICT-based face-to-face service encounter with ICT-enabled interaction between employees and customers Video conferencing tools to enable reciprocal value-creation
Impulse for the development	Bottom up Bricolage
Approach in innovation process	Fast prototyping Experimenting Learning by doing
Roles of customer	Correspondent Tester Dreamer
Roles of Employees	In-role (expected)

Table 2. Tentative empirical interpretations of results

5. DISCUSSION AND CONCLUDING REMARKS

In this paper we have examined ICT-based service encounters as an innovation arena from the perspective of value expectations of different actors and the manifestation of different innovation logics within the ICT-based service development. In order to examine the potential for innovation lying within ICT-based service encounters, we argue that it is first necessary to specify the forms of ICT-based service encounters. With our empirical case study we were able to discover a new form of ICT-based service encounter within the frame suggested by Henten (2012): *the ICT-based face-to-face service encounter with ICT-enabled interaction between employees and customers*. In our empirical case study, the ICT-based F2F encounter is enabled by a video-conferencing tool, more precisely in the form of a digi-corner located in a grocery shop and a mobile video conference application which can be downloaded into a smartphone or a tablet. Our preliminary illustration from the case study serves as a starting point for narrowing the gap of empirical evidence on how ICT-based service encounters function as an arena for innovation. Due to the discovery of a new form of ICT-based service encounters, we argue that there is potential for innovation still to be researched and consequently to even better utilize in practice.

After on our specification to the categories of ICT-based service encounters, we are able to firstly conclude our research question regarding value expectations of different actors of ICT-based service encounters in service exchange and co-innovation. Based on our tentative empirical results, expectations related to Beneficial value was highlighted and shared among regional management, centralized service development and even frontline employees, in addition to strategic partners such as IT-provider and Local University. This notion is aligned with the definition of Vargo et al. (2008) of the beneficial value as the “adaptability and survivability of the beneficiary system” – referring to competitiveness and innovation capability in systemic level. Thus we suggest that our tentative empirical findings also reflect the ongoing transformation towards service orientation with underlying innovation logics and digitalization trend (e.g. Lusch & Nambisan 2015). Identification of the expectations considering Knowledge value (such as understanding value in use, new capabilities and novel ways for value co-creation and co-innovation) and Social capital (such as strategic partnerships) value are built in and are at the core of that profound renewal in the service eco system level, as stressed also by Lusch & Nambisan (2015) among others.

Based on tentative empirical results value expectations of customers focused not only on functional value, but also emotional and even symbolic value (cf. Rintamäki et al. 2007). These on one hand characterized general shift typical also insurance branch from tangible towards increasingly intangible, or operand resources, as the core in value co-creation, aligned by S-D logic too (e.g. Vargo et al. 2009). Thus regarding the more complex personal risk insurances, which deeply concern taking care of personal well-being and derived from fundamental human needs such as a feeling of security, and even continuous renewal. On the other hand the symbolic value can be interpreted as identifying with so-called pioneers and the possibility of collaborative innovation. Finally to conclude, our tentative empirical findings indicate that novel ICT based F2F service encounters have not been developed as such, but their innovation potential has been also acknowledged in the systemic sense.

Secondly, concerning the research question of the alternative innovation logics we discovered that the development of the ICT-based F2F service encounter originates from bottom-up, meaning that it is not guided by strategic innovation processes directed from the group management. This result supports the argument that service innovation does not always occur in a planned and structured manner, but can occur through practise-based changes. Similarly, Sorensen et al. (2013) have shown that innovation activity is typically a more or less informal and continuous practice embedded in dynamic and interactive value co-creation processes within service encounters between employees and customers. The interactivity and continuous learning were manifested in our case study, as the approach of the development is to experiment new ICT-based F2F service solutions together with customers and employees, and if the experiments are successful, they will be developed further, thus integrating innovation activities into service practice (Toivonen, 2010).

The roles of employees in the experimentations are highlighted in our empirical case, and based on our tentative interpretations; we argue that if the innovation activities are integrated in the tasks of front-line employees (expected in-role) and resources are allocated for development work, the ICT-based service encounter will be more successful. ICT does not only change the nature of the service from the perspective of customers, but to a great extent also from the perspective of employees as the way of interacting is transformed. The role of customers was also highlighted in our study, and the variety of different ways of integrating customers into the service development, which are highlighted in the study of service encounter based innovation by Sorensen et al. (2013).

We thus suggest that the ICT-based F2F service encounters can provide a dynamic interactive arena for innovation, if the current way of doing and modifying service activities iteratively is challenged by experimenting, reflecting and developing further in a relevant manner. The experimental, emergent, uncertain and iterative nature of innovation activity is highlighted as innovations are increasingly understood to be created in social working activities in business practice. (e.g. Ellström, 2010; Sorensen et al., 2013; Lusch & Nambisan 2014).

By examining the ICT-based F2F service encounter from an innovation perspective, this paper contributes to the understanding of the resources and management (built in innovation logics) needed to utilize the collaborative innovation potential of ICT-based service encounters. Our results are very tentative but promising; our empirical case study has provided better understanding of the studied phenomenon (Yin, 2008). In terms of validity, we triangulated the results between the researchers and case representatives (Kvale, 1996), however, more empirical validation is needed. As this is the main *limitation*, it also opens up possibilities for researchers to challenge and develop our frames further.

Next, in our on-going project, we focus on digging deeper into our case study and expanding our research also to other similar cases in the company group, also to the B2B sector.

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Comparing methods for involving users in ideation. The use of Future Workshops and Blogs in Library Innovation

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In this paper we discuss how users may be involved in the ideation phase of innovation. The study compares the use of a blog and three future workshops (students, employees and a mix of the two) in a library. Our study shows that the blog is efficient in giving the users voice whereas the mixed workshop method (involving users and employees) is especially good at qualifying and further developing ideas. The findings suggest that methods for involving users in ideation should be carefully selected and combined to achieve optimum benefits and avoid potential disadvantages.

1. Introductions

Innovation and especially involvement of the users / customers has been on organizations' agenda for quite a while. The developments within technology and especially social media has paved the way for a wide range of new technologies such as blogs and wiki which can be used for innovation (Bjelland & Wood, 2008) More dedicated software has also been developed such as e.g. idea competitions and innovation contests (e.g. Ebner et al., 2009; Bullinger et al., 2010).

In this paper we focus especially on the involvement of users in service innovation (Alam, 2006), primarily through the use of technology (Kristensson et al. 2008) and in particularly social media (Scupola & Nicolajsen, 2014) such as blogs, which are widely available at a low price and fairly easy to set up, making them a tool for all organizations, even those with a low budget.

In this paper we discuss and compare two different methods for involving users in the ideation phase. Our understanding of user involvement in the ideation phase entails contributions of various kinds. For example, according to Alam (2006) customer activities in the ideation phase concerns describing needs, problems and solutions. Customers may suggest wanted features and preferences or they may evaluate existing services, pinpoint lackings in the market or come up with wishes for new services. Input that according to Magnusson (2003) often needs to be further developed to be implementable.

The paper is based on two innovation experiments (Sørensen et al 2010) at Roskilde University Library. The experiments were part of a longer lasting longitudinal case study (Yin, 1994) in which we investigated innovation at the Library. The case study found that the major sources of innovation were technological development and inspiration from other university libraries. Sometimes more local innovations were suggested by employees if they saw opportunities, for example inspired by the

service encounters. Thus users were indirectly represented. However, direct user input for innovation was rather scarce (Scupola & Nicolajsen, 2010).

To challenge the lacking user involvement in the library and the top management's skepticism towards user involvement we decided to run two field experiments involving the users in different ways using different methods and with and without close interaction with employees. A blog was developed and library users were invited to come up with ideas (Nicolajsen, Scupola & Sørensen, 2010). Subsequently workshops using the Future Workshop method were held (Nicolajsen, Scupola & Sørensen, 2011). The two methods are rather different and are of course not straightforward to compare. We will discuss the strengths and weaknesses of the two methods with regard to resources spent, outcomes in terms of number of ideas and how elaborated these ideas are, the roles of the involved, the process etc.

<i>User (customer) roles in NPD (Nambisan, 2002)</i>	<i>NPD Phases (Nambisan, 2002)</i>	<i>10 stages of new service development (Alam & Perry, 2002)</i>	<i>Examples on different methods used to involve users in different phases (Sundbo et al, 2012)</i>
		(a) strategic planning	
Customer as resource	Ideation	(b) idea generation (c) Idea screening	<ul style="list-style-type: none"> - Users articulating conditions they like/dislike - The service encounter - Complaints - Online communities - Datamining of online user behavior - Lead users
Customer as co-creator	Design and development	(d) business analysis (e) formation of cross functional team (f) Services and process design (g) personnel training	<ul style="list-style-type: none"> - focus groups - innovation labs (in the company / at the customer) - idea forum - the user as co-developer
Customer as user	Product testing Product support	(h) service testing (i) test marketing	<ul style="list-style-type: none"> - user input from test - test of service prototypes
Customer as a partner	All the phases above		<ul style="list-style-type: none"> - Involvement of the users throughout the project - the user as active partner - common innovation projects

Table 1 User roles, innovation phases and methods for involvement (further development of Scupola & Nicolajsen, 2010)

Our research question is; what are the strength and weaknesses of using different methods, more specifically Future Workshops and Blogs, to involve users in innovation? Thus, the paper contributes to existing knowledge about user driven innovation by comparing and assessing the innovation value of fundamentally different, but (perhaps) complementary methods for involving users in innovation. Furthermore, by carrying out field experiments the findings can be of direct practical value for other organizations and for libraries in particular.

The paper is structured as follows: First, we outline the theoretical basis of the paper discussing the potential of user involvement in ideation processes. Second, we describe the method and in particular the set-up of the two experiments. Third, we present the findings from the experiments. Fourth, we compare and discuss the methods and finally, we draw the most significant conclusions that can be made from our study.

2. Involving users in innovation

The intensified focus on innovation in the last couple of decades and not least the involvement of external stakeholders - in particular users and customers - has led to quite an amount of research within the field.

Users may get involved at different stages of the innovation process of an organization taking on different roles through different means. This is illustrated below by integrating the work of eg. Nambisan (2002) working on new product development and different user roles, Alam and Perrys (2002) work on customer involvement in service innovation and different methods and means to involve users (Sundbo et al. 2012).

Users may be involved: 1) as a resource in the ideation phase including idea generation and idea screening; 2) as co-creators in the design and development phase including e.g. in business analysis or service and process design; 3) as users testing products and services and marketing strategies or supporting a service or a product in the market. Earlier research has shown that organizations are best at involving the users in the early or later phases (Alam, 2002) as either a resource or in the role as users, rather than in the development phases.

Involving the users in the ideation phase may be done in a number of different ways and using a number of different media (Sundbo et al., 2012). The development within the area of IT and especially social media has resulted in a whole new wave of solutions as alternatives to workshops, focus groups, complaint boxes, satisfaction surveys etc.

As we are particularly interested in the ideation phase, we will zoom in on this aspect. Our understanding of user involvement in the ideation phase entails contributions of various kinds. For example, according to Alam (2006), customer activities in the ideation phase concerns describing needs, problems and solutions. Customers may suggest wanted features and preferences or they may evaluate existing services, lackings in the market or wishes for new services. Future workshops are expected to adress both critiques and more creative input through the different phases of the workshops: critics, utopians, solutions and implementation.

Several researchers (e.g. Narver et al., 2004; Alam, 2006; Magnusson, 2003) argue that the direct interaction between customer and employee provides an occasion to get both ideas and an understanding of customers needs. For example Magnusson (2003) argues for the benefits of physical meetings between professionals and customers, because meetings may provide the professionals with insight into the customers' needs and understandings and, conversely, the users may get a better understanding of the development conditions allowing them to suggest more realistic ideas. Magnusson's (2003) research further suggests that user suggestions are more creative and useful than the suggestions of the professionals. However, his study also shows that there is a need for professional elaboration of the users' ideas to make them implementable (Magnusson, 2003).

When looking at different types of input from users, Narver et al (2004) distinguish between responsive and proactive market approaches. In the responsive approach focus is on the conscious and expressible needs of the customer. In the proactive approach focus is on the latent needs, these may be unknown to the customer himself initially, some would argue not yet developed.

Approach	Responsive	Proactive
Basis of ideas	Conscious problems and needs	Latent and created wishes and needs
Innovation potential	Incremental	Incremental and radical
Methods	User behaviour and evaluation	Creative and constructive approaches
Examples of Tools	Log files, surveys, interviews and observations	Interaction and fantasy

Table 2 Responsive and proactive approaches to user involvement in the ideation phase of service innovation inspired by Narver et al. (2004)

The two different approaches are described as separate, though in reality they are probably not. However they provide us with an understanding of different potentials of - and ways to - involve users. The responsive approach leads primarily to incremental innovations. The proactive approach has per se the greatest potential for more radical innovations but the resulting ideas will be harder to implement. In the ideation phase of the innovation process an understanding of the differences between involving users in idea provision and idea creation is important. Idea provision involves asking users about 'good ideas' which are often based on their immediate experiences using existing services. Idea creation are seen as involving a process of developing and identifying latent and upcoming needs, new ways of seeing and doing things. These considerations are summarized in table 2.

Theory thus suggests that different benefits may arise from involving users in ideation processes. Additionally, different empirical studies carried out in different environments have indicated how such benefits may be obtained. In the following we compare the use of different methods in the same innovation context and thereby seek to compare the use of these methods in order to expand and qualify the existing knowledge about benefits and disadvantages of different modes of user involvement in ideation processes.

3. Method: experiments at Roskilde University Library

Our longitudinal case study (Yin, 1994) at Roskilde University Library was part of the ICE project (www.ice-project.dk). ICE is an acronym for Innovation, Customers and Employees. The focus of ICE is the many different types of service encounters between employees and customers and how these are or may be used to generate innovations for service organizations.

Since 2008 we have followed the innovation strategies and innovation practices at Roskilde University Library (RUB). RUB is connected to Roskilde University, which is a public university in Denmark located 35 km from Copenhagen. The library provides services to the university students and faculty members, companies and is open to the general public.

In this round of research at RUB we started out drawing a picture of the innovation activities and initiatives at RUB as well as the underlying understanding of innovation, with a particular focus on how employees and customers are involved. A number of interviews were made with employees and management. It became clear that customers are involved in limited and rather local ways. Furthermore, skeptics about the value of user involvement were found within the management group (Scupola & Nicolajsen, 2010). As a consequence we decided in collaboration with the management group at RUB to set up experiments to test the skeptics and qualify the test by generating new insight.

Setting up and or following experiments is an explicit purpose of the ICE project with the aim of generating new insight for organizations and the field of research. Semi-structured qualitative interviews as well as a number of meetings and workshops lasting between 1 and 2 hours with top managers, middle managers, and 'front-line' librarians were the main data collection methods used. Based on the results from these interviews, showing that there was almost no direct involvement of the library users in the innovation process of the library services, an agreement was made between the researchers and the library management to conduct an experiment with social media to collect ideas from the users. Given the library's previous experience with a blog used for internal communication it was decided to implement a blog on the library website, entitled "RUBminds". The establishment of the blog and later on the Future workshops to collect innovative ideas from the customers is here defined as field experiments. A field experiment is an experiment carried out in a natural context rather than in a laboratory. In this type of experiment, some control over the experiment itself is lost (compared with the traditional laboratory experiment), but the advantage is that the "natural settings ensure that the results will tell us something useful about the real world, not just some contrived laboratory setting" (Green & Gerber, 2003, 94). In spite of being a rarely applied method in innovation research such field-experiments have been argued to possess the capability of providing practically applicable knowledge about innovation processes while solving real life innovation problems (Sørensen et al. 2010). Field experiments are similar to other practice oriented methods such as action research, action learning and reflexive practice (Baskerville and Wood-Harper, 1996). Semi-structured interviews and workshops with the library employees that had been involved in the blog experiment were conducted to evaluate the experiment and the results obtained. Other data col-

lection methods used in this study includes library reports, minutes of top management meetings as well as click stream analysis. Below we describe in more detail the set-up of, first, the blog and, second, the future workshop experiments.

3.1. RUBminds - a blog experiment

The first experiment concerned the use of an online media to invite users to communicate ideas for the development of the library following other experiments (eg. Magnusson et al. 2003). The Blog, RUBminds, was set up, with four themes for user contributions. The topics in RUBminds were formulated to get feedback on the services provided by the library and the physical settings. The topics were formulated as questions on the blog: 1) "Do we comply with your wishes?"; 2) "If you should furnish the library....?"; 3) "Is Rub your favorite library?"; and 4) "The future of the library – give us your suggestions". It can be argued that the questions overlap, however the different formulations sought to motivate for different answers. In addition to the questions a small piece of text giving examples of the kind of input looked for was put on the first page of the blog.

The blog experiment was advertised online at the home page of RUB with a direct link to the blog and through posters at the university campus describing the blog. Additionally, bookmarkers with the blog address were handed out to the library users in the library.

To motivate library users to participate in the experiment gift cards were promised at the end of the experiment to two randomly drawn blog contributors. This was written on the main page of the blog. The blog experiment was conducted for a period of three months. To increase credibility of the initiative, the blog introduction stated that the library would follow up on the ideas provided on the blog.

During the experiment, the library employees had the possibility to comment and respond to the users' postings, since the idea was that the blog should function as an interactive platform between the users and the employees. At the end of the experiment period, the ideas collected through the blog were analyzed and discussed by library management in relation to their relevance and implementation potential at a management meeting.

3.2. Future Workshops

The second experiment consisted of workshops based on the Future Workshop method (JungK & Müllert, 1987). Three future workshops ran simultaneously at the premises of Roskilde University Library. We (the authors) facilitated a workshop each. Having the workshops running simultaneously made them less vulnerable to no show participants as all participants would fit into two of three workshops. Due to earlier experiences 6 participants in each of the three workshops was seen as optimal (thus requiring a total of 9 students and 9 employees). 12 students (among 20 who signed up) was invited (as we foresaw a certain amount of no show), the library agreed to match the number of students at the day with an equal amount of employees.

The workshop was placed on a day with few teaching obligations for the library personnel. In addition it was placed late in the year to ensure that students at all

levels of study had been introduced and had had tasks where they were expected to use library services. In addition the workshops were placed in the middle of the project period, as we know that students are too busy in the end of this period as well as during periods of exams. Regarding recruitment of employees we asked for personnel in different positions and no leaders. The request for no leaders was made based on speculations, that leaders presence would make some employees act less freely and thereby limit the creativeness.

The recruitment of students, as the largest user group, was made in the weeks before the workshops. Recruitment sheets were placed in the library loan counter and students were invited to sign up by writing their names, telephone number, email and their semester of study. We used the names and the semester of study to ensure as broad user representation as possible, meaning we invited students of different sex and at different study levels. Students participating were given a symbolic gift card for their participation, the employees were assumed to participate as part of their job, with no further reward given.

To meet and ensure the best possible foundation of comparability across the workshops we developed common guidelines for the workshops. The guide was made with inspiration from Jungk & Müllert's (1987) concept of future workshops. The method provides for creative thinking leading to solutions by separating creativity and rationality, which is often seen as imposing limitations on each other. The first phase is the critique phase here the participants are asked to write down criticism, bad experiences, limitations etc. getting rid of frustrations regarding the theme in focus. In the following phase – the fantasy phase, the participants are asked to dream away - setting up utopian or wishful scenarios. This phase is meant to open up people's minds. In these first two phases the participants are asked to take turns providing input. It is not allowed to place any criticism however expansion on the input is invited for. In the reality phase the participants formulate more realistic scenarios based on the developed utopias. This is followed by the implementation phase where the requirements for implementation is discussed regarding the type and amount of resources needed. Jungk & Müllert (1987) argue for an extended period of time to be used when running through the four phases and preferable more than one day. Here the workshop lasted only 2 hours with 1½ hour getting through the four phases. In our set-up each phase was given 20 minutes. In addition each phase was rounded up by a selection of the most important - critics / fantasies / suggestions / implementations, which was seen as a way to narrow the scope of the following phase.

<i>User workshop</i>	<i>Employees workshop</i>	<i>Mixed workshop</i>
6 students:	5 employees:	6 participants:
2 males and 4 females	1 man and 4 women	3 female students 1 male employee 2 female employees
Freshman- master level Average age: 24	2 younger and three elderly employees (close to pension) average age: 52	Students from 1,3 and 5 semester (one is student assistant at the library) middle age employees average age: 33 (students 23; employees 43)

Very eager, high participation from all – interested in the method itself and in generating solutions	Reluctant participation. 2 very active, one middle active and 2 very limited	Variation in participation employees in general more active than students however also difference in engagement within the two groups
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Table 3 Information on workshop participants and process observations

The process was documented in a number of different ways. The physical outputs (posters with post it notes) of the different phases were photographed and the posters were turned into excel databases, one for each workshop. In addition the workshop sessions were tape-recorded. When the workshops had ended all participants were asked to fill in a questionnaire asking about what they personally saw as the most valuable ideas in relation to the needs of library users.

3.3. The blog

During the two month in which the blog experiment was conducted, 1.011 visits were made to the blog and 2572 pages were looked at. On average, the visitors stayed for 1 minute and 35 seconds. The number of contributions indicates that it is difficult to make users contribute even if they get to the page. As can be seen in the table below, there is an overall falling activity from the first to the last theme on the blog. The first theme, which appears on the entrance page have most activity. However, the other themes also score quite a number of hits and the fact that the last theme has more hits than the second last, indicate that some visitors orient themselves on the theme that look more interesting to them and not just the first one.

Blog-Questions	Number of hits	"Ideas"	User comments	Library responses
Do we comply with your wishes?	807	11	7	2
If you should furnish the University library....	632	8	5	1
Is Roskilde University library your favourite library?	498	3	2	0
Libraries' future - give us your suggestions!	587	5	3	1
Across the topics	2572	27	17	4

Table 4 The number of ideas, and contributions within the four blog themes

The inputs provided address a wide range of "library user activities" indicating that different user roles and use situations are considered. Regarding interactivity among the blog contributors, our results show that the various inputs are primarily independent ideas, as users do not expand upon each other's messages, despite the fact that the technology provides for this functionality. However two users express their agreement in general with the other contributors and one even provide an explanation to the comment of another user.

The Library did not respond to the comments until later in the process. However it was decided to do so to show that the input was received and taken seriously.

A total of 27 “useful” ideas were provided during the period the experiment run. The ideas generated by the users on the blog were very different in nature and covered a wide range of topics as illustrated by the examples provided in the next table. Some ideas are visions of a whole new way of seeing the function of the library - as for example the library as cultural event place. Some are suggestions for new services such as an EndNote course, others suggest big or small changes in the services already offered such as access to computers in the library reading areas. A few comments just criticize the present service offerings, without providing suggestions for improvements.

• Suggestion for RUB to provide students and employees with short courses on End Notes software
• Suggestion to change copy machines so that the same copy card can be used both at the University and the Library, thus improving the copy services
• Suggestion to extend the time period users can keep the books loaned from other libraries through the Interlibrary Loan.
• Increase the number of full text resources provided in electronic form
• Establish a Silent room with computers
• Establish small rooms where student groups conducting project work could meet and work instead of only having open space areas
• Establishment of a cozy lounge area with newspapers, a coffee machine, sandwiches and candy
• Establish open air library services, outside the library building, including Internet access, shadow and shelter in the summer
• Decrease the noise level generated by the air condition system in the silent area

Table 5 Examples of ideas contributed to the blog

In interviews conducted after the experiment RUB management stated that the blog did bring about some interesting ideas. The ideas were quite different: some ideas were seen as suggestions for radical innovations, while others required incremental changes of what was presently done. Furthermore, a few ideas posted on the blog addressed problems that were well known to the library but had been forgotten or otherwise not taken care of. The library personnel expressed a feeling of pressure to do something about the implementation of the ideas due to the public expressions of the ideas. Some ideas however needed further investigation before the library could evaluate to implement them or not; a few were completely dropped due to implementation requirements such as the establishment of open-air library services during summer time.

RUB expressed the low activities as an advantage because the resources needed to manage the blog were constrained along with the resources to follow up and still the blog did provide some useful insights and branded RUB as being open to constructive criticism.

3.4. Future workshops

Taking a broad look at the prioritized ideas there are some similar categories and suggestions across the three workshops, others differ tremendously and the level of details differs.

<i>User (student) workshop</i>	<i>Employees workshop</i>	<i>Mixed workshop</i>
Search facilities (5)	Communication responsible (5)	Group facilities (4)
Branding of services (3)	Visual representation of the physical library (3)	Visual navigation in the Library (2)
Café (3)	Better equipment for usage of library material (1)	One access point to online services (2)
Close collaboration between faculties and RUB (3)		More online resources (2)
RUB as a study place (3)		Silent rooms with computers (1)
Alternative workshops (1)		More info to new students (1)
		Hide UDK (1)
		More advanced course (1)
		Library representatives at RUC (1)
		SMS info on loan returns (1)
		Communication strategy at RUB (1)

Table 6 Most valuable ideas reported by the workshop participants (number of participants)

In the student group the students did not know each other in advance. They valued a rather low number of ideas (6) – indicating that some kind of common understanding existed in the group. Five ideas were found valuable by 3 or more students. The numbers indicate that this is a somewhat homogenous group with similar needs and wants.

In the employee group the picture is different. Three of five employees report just one or two ideas as being valuable. This may be seen as a statement, not least because there is agreement on the need to hire a communication employee. Four ideas are reported in total with some agreement, which again indicate that this is a group with rather similar understandings of what is needed and with a focus on back office issues. One reason for the limited number of ideas is that there is a great overlap and more consent on what is important in this group. This may be explained by groupthink and the fact that they do face some fundamental challenges as a group - they are all co-workers, they know each other and have a shared daily workplace. The documentation of the process shows some frustration and difficulties in moving away from the internal challenges faced at the library, which seemed to limit the creativity throughout the workshop.

In the mixed group 10 different ideas were valued and much less agreement was found, most ideas were reported valuable by only one or two participants. This may be explained by the fact that this group is also the most diverse as it consists of both employees and students. The enthusiasm in this group was found to be higher than in the other groups especially with regard to the employees in the two groups. This

may be due to the attitudes of the employees who participated here, however another explanation is that these employees are inspired and feel more obligated to participate as ambassadors for the library because of the interaction with the users in this group.

If we look at the ideas prioritized they also differ in terms of content across the student and employee group whereas they are a mix within the last group. This points to what would also logically be expected that employees and users have different perspectives. The ideas suggested by the employees are just titles with little explanations and they are means to develop and reach for new solutions. In the two groups with student participants we find that both employees and students are more oriented towards arguing why, what they see as valuable is valuable. The explanations are somewhat different and in some instances very specific and in addition they can be argued to point to solutions more than means. We know from the mixed group that the employees to a large extent did take a more active role than students however the outcome reported is rather different from what their peers in the employee group report. Interestingly we find evidence that some of the ideas that came up within the pure student group are almost non-existing in the mixed group - namely the one of a better integration by RUC and RUB which is in fact one of the highest valued ideas in the student group. In addition the students in the mixed group are not mentioning the need to improve the search facilities, which is a priority among 5 out of six in the pure student group.

The workshops indicate that employees do in fact get a better insight into the user preference when meeting the users as suggested by Magnusson (2003). We also found that users get a better understanding of why some possibilities are not within reach – such as the possibilities of a café at the library which at least would require new deals being executed regarding catering at the campus. It was also argued that users' ideas are more creative. We would argue that users do provide for better solutions because they do in fact represent themselves better than what a librarian may, at least regarding some services. This is supported by the fact that an employee suggested a solution to a mentioned problem, however the solution did not fit according to the students; neither did a second suggestion. This discussion about how best to reach students when marketing new services thus developed through a dialogue. However the same solutions were pointed at without the employees. This indicates that students alone may in fact provide very good input for service innovation when just looking at the valued input. However the mixed group did come up with even more ideas and it did educate the librarians in seeing the need for doing things differently and creating a better understanding of what should be done and how. This may in fact turn out as being valuable in the following up on the outcome of all three workshops.

4. Comparing the two methods

What we see from the field experiments is that users may be involved in the ideation phase but that some of this interaction may in fact also involve elements of users as

co-developers, when employees and users get into ongoing communication about particular services.

When comparing the outcome of the blog and the three workshops we see that the blog and the student groups are the best solution if the goal is to get as many ideas from the students. Here ideas are understood in accordance with Alam (2006) who argues, that "ideas" can be many different things such as critics, suggestions for smaller changes or more challenging suggestions. The blog produces more contributions compared to any of the workshops. This measure is sensitive to the time span and also how many ideas the participants in the workshops were asked to report as valuable. The numbers may however point to the fact that while the workshops only involve six participants the blog potentially reach a larger number of users as all students are invited (other groups could contribute as well). The question here is whether the possibility of the blog is visible and if the students are willing and have something they want to contribute. What we see from the workshops is that the student group comes up with ideas that are not presented in the employee group, which indicates that the employees are not necessarily good at representing the users (which does, however, not mean that the employees input is not valuable). What we see is that many of the same ideas appear using the two different methods, however more ideas and more different types of ideas appear in the blog compared to the workshop. An explanation could be that groupthink develops fast in a small intensive group. The differences in outcome between the student group and the mixed group can be explained by the students having a lower voice in the mixed group because they feel intimidated working together with professionals. Another explanation is that students withdraw ideas that employees argue are impossible to meet. We know that some of the ideas on the blog were disregarded, as they are impossible to meet due to e.g. agreements with the world famous architect building the library – which was also a theme in the mixed group.

It is not just a matter of getting many ideas, but getting good ideas, judging what is a good idea is of course difficult. In both methods most of the contributed ideas points to incremental innovations, some provided more radical suggestions (primarily on the blog), while a few comments just criticize the present service offerings, without providing suggestions for improvements. We found it rather surprising that the blog inspired to the wildest ideas, as the workshop would have phantasy and creativity as an integrated element, but maybe the need to report the most valuable ideas swept them out. Nevertheless we thought it would be hard to achieve on the blog, though the introduction did invite users to present utopic ideas.

The other issue in relation to users as a resource in the phase of ideation is idea screening. Idea screening in terms of placing value on the ideas was integrated in the workshop format, the outcome is thus a matter of what the participants as a group found valuable, which gave some rough indications, as it was just small groups. On the blog only few indications were found. There is no common practice in blogs for providing such information, and only few likes were given on the library blog. Likes could be an indicator, but it needs to be taken with caution (likes can be used to indicate acknowledgement of contributions rather than agreement). Comments articulating agreement (or disagreement) (which the blog had a few of) are more straightforward. The workshop format seems to provide more input both in terms of the integrated screening (value setting mechanism) but also through the

discussions, through which arguments for the need would be discussed, it is however easily forgotten if the process is not documented in a form where it is easy to get back to or if the employees do not bring it further – which is only a possibility from the mixed group.

Users are needed not only to suggest input and qualify the input into ideas but are also needed to help evaluate and develop the ideas. Both critics and concrete ideas were found valuable. This means that all the different kinds of input that might come according to Alam (2006) are found valuable (maybe the 'wild' ideas less). However, some ideas and suggestions and in particular critics may be in need for further elaboration to get turned into something valuable to the user. Magnusson (2003) discusses the need of the users to be creative in the first place and then the professionals to turn it into a professional service. Here we see that users are also needed in the further development otherwise small issues like how to market a service may result in too few knowing about a new service.

With regard to ongoing communication a difference was experienced between the blog and the mixed group. In the mixed group the interaction between employees and students did in a few instances lead to ideas getting more developed, if an employee presented a solution to an idea, which was then corrected or further elaborated by the students. This kind of interaction did not appear on the blog. It could be argued that it may happen if a timely response is given to the different ideas. However, this requires that the user returns to the blog to respond or that another user responds which is not always likely. Due to the opportunities of these interactions in the mixed group, it could be argued to combine the benefits of blogs and dialogue with a group of users.

A final insight from the study regards the transparency of user involvement. The use of the blog created a new communication platform for the library with a transparency of the user input not earlier experienced. The library felt obliged to take into serious consideration the ideas posted on the blog, due to the transparency of the documented contributions, a responsibility related to the transparency of online media as argued by Kuhn (2007).

5. Conclusion

Our study shows that both blogs and future workshops with user involvement can provide an organization, here RUB, with valuable information. Whereas the blog and the workshop with users, here students, primarily support ideation, the workshop with both users and employees sustain more interaction, thus supporting that users take on the role as co-creators.

Whereas the workshop primarily resulted in incremental innovation ideas, the blog activated more diverse, wilder and more radical ideas, which was surprising. In addition the blog induced more pressure for action than the workshops, due to its transparency to the public.

It may thus be argued that to obtain the most ideas and to represent the users best an online media, such as a blog, could be used, but to involve users in screening workshops with (the highest) user representation better than the blog media,

further development of the ideas are however best achieved in workshops with both users and employees.

At a more general level the findings suggest that the different methods experimented with in the library provide a number of varied benefits and challenges. Thus, companies and organizations should not blindly apply methods, e.g. blogs or workshops, as a mean to induce user-driven innovation. Instead the chosen method (including also other potential methods) should be chosen with care and be aligned with the organizations' innovation needs and considering the potential negative effects of the methods. Thus, for example, the readiness of an organization to adopt and develop user ideas could make a blog a more or less favorable tool.

Focusing on students representing the users of the library is a somewhat limited approach in the experiments reported in this paper. Teachers, other university personnel and a few external actors could be relevant users too. However, students are the primary user group in the library.

For purposes of generalization the library of course represents a special case. Though the experiments have created new insights about the benefits of different methods for involving users in innovation the results cannot easily be generalized (in a positivist sense) but other types of organizations may still be inspired and learn from the findings. Nevertheless, there is a need for more research on different methods in different environments to develop a fuller understanding of the benefits and potential disadvantages of such methods in various settings.

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H2: ICT, learning and innovation in health care services

Chair: Christian Bourret

Gamification as an enabler of mutual learning in complex health care systems

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In our paper, we present a gamified role switching method which has been developed to promote dialogue and mutual learning in complex health care organisations. Our research is based on two case studies with 25 interviews and four workshops. Our study indicates that the gamified role switching method inspired and gave means for the participants to enhance systemic understanding of their organization and to improve dialogue. The role switching method also made the participants see the situation from the other perspectives and thus promoted collaboration and the change process.

1. Introduction

Major challenges are emerging in the health care service system as chronic diseases are increasing and the population is ageing. At the same time new ICT solutions and citizens' increased expectations have led to the situation where the health care system needs radical changes. New innovations and methods are needed to ensure the quality of health care services. However, at the same time, the service as a whole becomes increasingly complex and the needed change is difficult to specify and describe. Furthermore, this complexity makes it more difficult for the customers to understand and participate to their care processes.

The evaluation of the success (or failure) of an organisational change is difficult because of multiple reasons (Hughes 2011). This makes it challenging to identify the true factors that promote the successful organisational change even though numerous guidelines and models for change management have been published. Jorgensen et al. (2014) note that one key issue for successful change is the consistent engagement of the employees during the change process. The successful "change architects" seek collaboration across the entire organisation. It is also important to notice that in order to promote change, participation of different stakeholder, not only employees of the organisation, are needed. There are also methods developed to promote the participation of different stakeholders. A dialogue between organizations, professionals and customers is essential in ensuring the high quality health care services. (Kivisaari et al. 2004, 2013) One of the most commonly noted challenge was the underestimation of the complexity of the organisation (Jorgensen et al. 2014). This is likely to be based on the lack of the systemic view and understanding of the intrinsic complexity of any social system (eg. organisation).

Gamification is the use of game-like elements and game-design principles in non-game applications (Deterding et al. 2011). For instance, storytelling is a form of gamification that allows systemic aspects of health care processes to be discussed among a group of players: different roles produce different perspectives and coherent storylines involving different

stakeholders concretize the often fuzzy interactions between different actors and actions. We see gamification as a promising tool for collaborative learning and promoting dialogue and innovation. In our previous research (Leväsluoto et al. 2014) we argued that in order to promote change processes in health care, we need shared visions, collaboration, support and education of professionals to adapt to changes which are taking place in health care. These changes also include multi professional work and new electronic ICT-based tools.

In this paper we examine the change process in organizations and whether change can be promoted through gamified solutions. Gamification in this context aims to make the organisational processes more engaging and inspiring. The focus of gamification in our cases has been on improving mutual learning by means of role switching game. Mutual learning can be achieved by creating dialogue and opening perspectives of different actors (Kivisaari et al. 2004). Collaborating across the organisation has been noted as important for successful organisational change (as mentioned above). In our case studies we focused especially on mutual learning as a form of collaboration. The importance of a systemic view and acknowledging other actors in the management of changing systems has been noted both in the literature (see e.g. Reiman et al. 2015) and in our case studies.

The following research questions are guiding our work:

- Can gamified solution inspire to learn and understand the viewpoints of other professions and a system view?
- Can gamified solutions activate dialogue and mutual learning?

The focus of this paper is on the results of the work we have done to develop a gamified role switching method. The further development work towards a “medication game” will still continue and will be finalised by the end of year 2015.

In our paper, at first we describe our theoretical framework which is based on gamification, societal embedding of innovation and role switching. Then we present our case studies and continue to the research results. In the conclusion, we discuss the issues faced in the two cases when promoting dialogue and mutual learning. We end our paper with the conclusions of our research.

2. Theoretical background

Our theoretical framework is based on theories of gamification, societal embedding of innovation and role switching. These theoretical frameworks form our starting point in understanding how to promote dialogue and mutual learning in complex organisations. In the framework of gamification, the factors of engagement and inspiration has been examined as well as the transfer of the engaging and inspiring elements from games to organisation management. How to create dialogue and promote mutual learning is the key issue in our second framework which is societal embedding of innovation. Role switching on the other hand can help to discover or even overcome biases in our reasoning and decision-making. The cognitive shortcuts can cause problems when we are unaware of them or when we apply them inappropriately. Seeing and feeling things from another person’s perspective can elicit some these biases and change the way we understand and reason behaviour.

2.1. Gamification

Gamification is the use of game thinking and game design elements (including game mechanics) in non-game contexts. The idea of gamification is to motivate people by means which have been proven to be effective in game environment. Gamification is widely used in marketing and more and more in different forms of media and education (e.g. different competitions). In practice, gamification may be applied everywhere when human behaviour is wished to be influenced.

There are several game-related concepts which may be some times overlapping but which should not be confused. These include: play, game, serious game, and gamification. Caillois (1961) has defined a play (and a game) as an activity which is voluntary, separate, uncertain, unproductive, governed by rules and make-believe. Games, serious games and gamification have many similar features like rules, goals and structure (Herger 2014).

The key difference between game and its “serious counterparts” is that serious game and gamification are aimed to promote the production of something which is useful also outside the game (learning, sales, etc.) whereas and game is played voluntarily “just for fun” because the player finds it attractive. However, by playing games you may also produce something useful and serious games (e.g. flight simulators) may be also used just for fun. Thus, the purpose makes the difference – you may have as fun in both cases. Caillois (1961) suggests the voluntarily is an essential condition joyous attraction of game. This is a notable remark when the game mechanisms are applied for instance in organisation management. Gamification is an activity to make existing or forthcoming process more engaging and inspiring (Chou 2015), while a serious game is a specific engaging and inspiring application which is especially played for serious purpose, e.g. learning something – i.e. a game which is aimed to produce something useful (Djaouti et al 2011).

Games, game thinking and game design elements have been systematically analysed for gamification. Chou (2015) has developed an Octalysis framework for the purpose of evaluation and development of gamified applications. Octalysis presents eight core drivers according to which different game elements may be classified. The key drivers are different aspects which may attract a player. The drivers include:

- Meaning: the goal or the mission the player has in the game
- Empowerment: player is able to express themselves, e.g. create something
- Social Influence: e.g. sense of belonging in a group, social pressure and opportunity to communicate
- Unpredictability: advantageous surprises and exciting turns in the course of events, or experienced tension for waiting surprises.
- Avoidance: player had to avoid something unwanted to happen – typically losing something
- Scarcity: player has an opportunity to get something which is somehow scarce: limited quantity, available at certain time only or for certain group only
- Ownership: player gets, collects or builds something as their own property

- Accomplishment: player achieves something as a result of their effort: points, higher ranking or status, recognition etc.

All these key drivers should be taken into account from the viewpoint of the target group in order to achieve a successful gamification. There are several different known game elements for each key driver.

The flow theory (Csikszentmihalyi 1990) is often mentioned as a psychological basis for game playing and gamification. Flow refers to an optimal experience, a state of mind during which people typically experience deep enjoyment, creativity, and involvement with the activity they are performing. The identified supporting conditions for flow state include: goal-orientation with clear goals, binding rules, feedback, skill is required, challenges and opportunities are provided. These are well in line with both the classifications by Herger and certain key drivers in the Octalysis framework. In addition, the optimal flow experience requires appropriate balance between skills and challenges: too demanding challenges cause a frustrating experience and too easy challenges cause boredom.

As the gamification process and Octalysis framework suggests, an extensive investigation of the key development needs were identified by interviews and discussions with the case organisation representatives. The gamification elements for these needs were then chosen and they appeared to be role switching, storytelling and some visual elements: playing board and cards.

2.2. Societal embedding of innovation

Societal embedding of innovation is a research and development approach which has been developed by VTT in different research projects since 1990's. It has been used in Finland to enhance novel health care services and environmentally friendly innovations (Kivisaari et al. 2004, 2013, Leväsluoto & Kivisaari 2012). It aims at facilitating and initiating new innovations in a multi-actor network. An important objective is to create a dialogue between different actors and give them a possibility to create a shared understanding of the elements of the solution. By opening up the perspectives of the different actors it aims to produce mutual learning.

The approach gives information about the needs of identified actor's, worries and conceptions of the discussed change. An important aim is to identify promoting and preventing aspects of different actors and bring them to shared discussions. The approach is based on thematic interviews, observation and workshops. For the interviews, it's essential to identify all the key actors to ensure that all the aspects are being heard. The information is then processed and used for promoting the change (for example the processed information can be used in organisation management) and planning the workshops. The aim of the workshops is to discuss all these different opinions, create more in-depth understanding of the change and create collaboration and trust. (Kivisaari et al. 2008)

Social embedding of innovation is one of the key theoretical frameworks in our paper as it emphasizes the role of creating dialogue between actors. In our research, role switching method is also based on the experiences of social embedding of innovation. The aim of it is to further develop the approach as an innovative and inspiring method.

2.3. Role switching

March and Olsen (2006) state that in most situations humans take reasoned action by trying to answer three elementary questions:

- what kind of a situation is this?
- what kind of person am I?
- what does a person such as I do in a situation such as this?

When role switching puts us in the shoes of another kind of person, we look reference from a new role. It does not change the perception of the situation but it can give us novel ideas on how and why to act in them. For example, when looking at a patient's medications what would a nurse focus on? And what would a pharmacist focus on? These might differ significantly. A pharmacist might look more at the patient's overall medication history and any cross reactions. A nurse looking at patient care from a pharmacist's role might see new practices that could be integrated to the care processes. Changing the perception of the situation can potentially also be achieved by role switching. An actor's view of the causes of his behaviour often differ from those held by outside observers. The actor has a tendency to emphasize environmental conditions. The observer on the other hand has a tendency to emphasize personality characteristics of the actor as causes of behaviour. (Jones and Nisbett, 1972) By assigning an observer to the role of actor and vice versa the situation and what lead to it can be seen in a different light.

3. Case context, methodology and results

In the empirical part of our paper we focus on two cases. In our first case, a university hospital was introducing an electronic medication storage unit. Changes in the medication process and operational culture were needed because of this coming change. In the second case, a clinical pathway for geriatric patients was implemented in a central hospital. In order for the clinical pathway to work as planned, changes in operation models are needed in the related private and public social and health care organisations.

The study is based on 25 interviews and four workshops with gamified and role switching aspects. The schedule and the number of participants in the interviews and workshops are summarized in table 1.

Table 1. Schedule and number of participants in the interviews and workshops

Gaming workshop	Interviews	Workshop, case 1	Workshop, case 2	Brainstorming of game concepts
May 2014, 15 participants	Case 1: May 2014, 9 interviews Case 2: Spring	Case 1: September 2014, 10 participants	Case 2: December 2014, 9 participants	Case 1: March 2015: 16 participants

	2014, 16 inter-views.			
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In the first workshop, the selected board games were played together with health care personnel and researchers in order to get familiar with different game ideas and mechanisms and to get feedback on what kind of gamification may be appropriate for health care personnel. In the fourth workshop the new game concepts to support the medication process were brainstormed together with health care professionals and researchers. The objective of this session was to get ideas how to further develop the role switching workshop approach which is in focus of this paper.

The interviews and the second and the third workshop are introduced below and are the focus of our paper. In between these mentioned five activities the group of researchers together with the representatives of the two case organisations carried out the analysis and development work in several sessions.

In both of our cases, creating dialogue and cooperation as well as seeing familiar situations from another perspective were important aspects of promoting change processes. The interviews gave an overview of the situation on which it was possible to start creating these workshops. The interviews also worked as a channel where employees and other actors could get their voice heard concerning the upcoming changes. The gamified role switching workshops were very similar to each other and were just modified to answer the needs of different cases. We summed up the interviews and the workshops by identifying visions and challenges (table 2 and 3) that prevent the change. Vision and challenges were identified and summarised so that they could provide information for the organisation on how to proceed with the implementation work and communicate the results to all employees.

3.1. Case 1: Changes in processes and in culture are needed to implement an electronic medication storage unit

Our first case organisation is a university hospital in one of the biggest cities in Finland. It provides basic and special services in the field of specialised care, trains health care professionals and promotes scientific research into health. The university hospital is a part of hospital district which provides care for 22 municipalities with population of 520 000.

The university hospital is implementing new electronic medication storage unit and because of this reform changes in medication processes are needed. A unit for renal patient is a pilot unit for implementation of the electronic medication storage unit. The renal unit was chosen to be the pilot unit, because the care of renal patient is highly dependent on medication and the unit uses a large amount of pharmaceuticals.

The change to using electronic medication storage unit is not straightforward as it needs changes in practices and in operational culture. Responsibilities of doctors and nurses need to have some changes as well as the sharing of responsibilities between units. One example of the change that needs to take place before implementing the electronic medication storage unit is the way patient medication data is being processed. If a patient is being relocated from the first aid unit to the renal unit, the medication information needs to be fed to data system before the patient enters the renal unit. Earlier the medication information was re-counted in many different ways and nurses had a chance to carry out the medication more

flexibly. The use of the new medication storage unit requires changes in the medication processes which are not easy to implement in a hospital with almost 6000 employees.

The work for purchasing and implementing the electronic medication storage unit had begun some years ago and was in the phase of planning the implementation when we carried out our research.

3.1.1. Methodology

In this case organisation, we interviewed nine health care experts that work with renal patients. The semi-structured interviews took place in May 2014. The interview questions were divided into five themes. The aim of the first theme was to gather information on the current situation, what are the things that are working and what are the things that need improvement. After that we discussed issues related to quality, safety and efficiency issues. We were interested in learning how the interviewees saw these factors in their organisation. In the third theme, we asked what the interviewee's experiences of previous development project were and what the organisations attitude towards them is. The forth theme concentrated on what were the interviewees visions of their organisation. The last theme was about the coming change and what the interviewees saw as the important aspects of the implementation process. The interviews were recorded and transcribed and we used QSR NVivo qualitative data analysis software for analysing the results. We carried out the analysis by performing a thematic analysis of the relevant research topics and identified the common responses of the interviewees

The workshop was organised in September 2014. Ten health care experts from the pilot unit, other units, pharmacists and project development experts participated in the workshop. The participants represented all the key positions and professions involved in implementation of the electronic medication storage unit. We disseminated a feedback questionnaire to the participants in order to evaluate our workshops and also to evaluate our gamified role switching method. The participants filled out the questionnaire after each part of the workshop. The focus in the workshop was in the renewal of the medication process and also in introducing the concept of the electronic medication storage unit. The aim was to support change process as well as to get feedback about our gamified role switching method. Because the implementation of the electronic medication storage unit requires many changes, which were not all positive to all employees, it was important to share opinions and reasoning behind them. We aimed at encouraging participants to discuss their opinions more freely and also to help the change process by making participants to look at the everyday situation from another perspective. Creating dialogue between participants of the elements of the needed solutions was also aimed.

In the workshop participants developed a story of the care of renal patient. The story was based on maximum ten events which were chosen by the participants. After that participants then picked randomly one card which represented one of the four professions (pharmacist, patient, doctor and nurse). Thinking each event from the perspective of the given profession was then required of the participants. Questions in the profession cards guided the work. The guiding questions were about how the represented professional would perform in this situation, what are the obstacles of acting in a new way and what are the benefits of this action.

3.1.2. Results from the interviews

Working practices

The interviewees were aware that the official procedures are not followed in all cases and places. There were concerns about the idealistic requirement to always strictly follow the rules even when it is known impossible. Instead, they suggested focusing on finding the correct solutions whenever it is possible. The interviewees showed a generally positive attitude towards pursuing improvements, but also noted that actual change takes place slowly.

The consistency of practices within a hospital was regarded as important factor for fluent and safe operation of the system as a whole. The largest differences can be found between the units. There is not necessarily any mandatory reason preventing harmonization, but people are inclined to stick on the familiar customs and present explanations for why they should not be changed. However, it was noted that there are different practices and in some cases the local differences are necessary. Flexibility is needed because of the differences in situations, experience and skill of actors and the intrinsic uncertainty in health care activities.

Values

Certain values clearly emerged in interviews.

- Expertise: health care professional should continuously update their knowledge and skills and they should be aware of the limits of them
- Patient-orientation: professionals want to be responsible and work for the best of patients. Initiative and activity is expected also from patients.
- Attitude to changes varies. There have been negative experiences of too frequent changes and failed projects. On the other hand, personnel participate actively to development. Control of errors is regarded as critical.

Information systems

The up-to-date information on the medication and its documentation in the patient information system was regarded as critical for the functioning of the future system. Currently there are some practices which may make some medication information unavailable to the information system. In the future system, this means that the medicine is not available, either. With current system and practices it is possible to get the required medicine somehow anyway. The doctors criticise the difficulty of using the information system – especially concerning medication. Different doctors may also have varying knowledge on medication: all doctors are not equally capable of extensively assessing the medication of all kinds of patients. This limited capability may make some doctors more cautious to make certain decisions on the medication. However, it was agreed that there should also be change in attitude towards an accurate use of the system. It was assumed that professionals focus on the fluency on their own duties and mostly prioritise lower the tasks which do not are directly useful to them. The role as a part of the care system and a fluent overall care of the patient is not either understood or accepted.

Expectations and concerns

The particular forthcoming change raised both (positive) expectations and concerns. The electronic medication storages were anticipated to improve patient safety and medicine control, enhance the conditions for work and clarify procedures for medication activities, and save costs. However, there were concerns about the bad usability of the information systems, excessive rigidity of new system, potentially vanishing knowledge on medicines, increasing work load, unpredicted problems in the initialization phase and concern about whether a critical medicine will be available if technical problems appear. Lacking information on the future changes raised concerns in general.

3.1.3. Results from the workshop

The results of the feedback questionnaires are presented in this section. All participants returned either fully or partly filled form. The participants expressed that the workshop promoted collaboration between professions. The role switching method was seen useful as it forced the participants to look at common situations from different perspective. It unveiled how little other professions' duties are known contrary to the expectations of some participants. The participants thought that this way you get insight of the reasons of action in different professions and organisations. The reasons of acting in certain way were not always familiar to participants coming from another profession.

Due to the gamified aspect, the workshop was experienced as inspiring and refreshingly different. In addition, the participants felt that they had a chance to influence the change process by participating in the workshop. For the participants, the workshop was in some sense demanding, because it required a full concentration. The task that was given was not immediately understood by the participants and the workshop was quite long.

The workshop produced new ideas and some concrete tools for the participants. Identifying risks and obstacles from different perspectives was an important outcome from the workshop. The workshop also increased understanding of the upcoming change, opened up new perspectives and included positive feelings towards the change. Multiprofessional collaboration was one of the things that the participants considered valuable.

We summed up the interviews and the workshops by identifying visions for the change as well as challenges that may prevent the change happen (table 2). Vision and challenges were identified and summarised to help the organisation for their implementation work.

Table 2. Identified vision and challenges in case 1.

Achieving the goal together				
	Patient	Pharmacist	Nurse	Doctor
Vision	Is familiar with his/hers medication and can communicate it to his/hers health provider in all situations	To become a one of the key professionals in the patients multi-professional care team	Implementing the patients medication prescribed by a doctor	Prescribing and monitoring up-to-date medication
Challenge	To become an	Readiness to	Clear and practical	Practical and

	active patient	adopt a new role, resources, attitudes of other professionals.	instructions which every professional follows	doable instructions which every professional follows, hurry and extra burden
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The top vision represents the attitude that only by working together the change, which is the success in using the electronic medication storage unit, is possible to achieve. Pharmacists were identified as a new important actor in patients care when using medication in hospital renal unit. Pharmacists could have new tasks which would support nurses and doctors work and this has the potential of clarifying the care of patients. For the pharmacists the role is new and it requires learning and resources. Patients on the other hand should adapt to a new role, where the medication information should be clear at all times. This requires being active and participation. The nurses would like to have clearer instructions which are followed by everyone. To doctors the change causes potentially more work and increases hurry. However, if the medication information is up-to-date, the doctors' work will ease eventually and the patient care would be better.

3.2. Case 2: Using a clinical pathway for elderly patients requires cooperation and new operation models

Our second case organisation is a central hospital which offers specialized health care for 13 municipalities. The population is approximately 165 000 and about half of them speaks Finnish, and another half Swedish as a first language. The central hospital is active in participating in research and development projects and is especially known for its work in patient safety issues.

In the beginning of our study a new clinical pathway for geriatric patients (a document) had been produced in cooperation between the hospital, primary health care, social sector actors and the representatives of patient, and the pathway was about to be launched. Putting together a clinical pathway was a great challenge, because the information was scattered and different units and organisations had different ways of working. A number of employees and customers participated in the work of gathering and formulating information to form the new clinical pathway.

The idea behind this development work was to make the customership of the geriatric patient more flexible, effective and safer. Geriatric patients are a special group because of their special needs and vulnerability. For example, it is important to acknowledge in hospital emergency room that geriatric patients need to be helped out of the bed so that they maintain their ability to move around and stay active. Also the medication information is essential to have with them when coming to the hospital. Many small improvements, especially when a patient visits between different organisations, can help make the care more effective which is the aim of the clinical pathway.

3.2.1. Methodology

We interviewed 16 social and health care experts from the organisation working with geriatric patients. The semi-structured interviews took place in the spring 2014. Like in the first

case, the interview questions were divided into five themes. The aim of the first theme was to gather information on the current situation, what are the things that are working and what are the things that need improvement. After that we discussed the issues related to quality, safety and efficiency issues. We were interested in learning how the interviewees saw these factors in their organisation. In the third theme, we asked what the interviewee's experiences of previous development project were and what the organisations attitude towards them is. The forth theme concentrated on what were the interviewees visions of their organisation. The last theme was about the coming change and what the interviewees saw were the important aspects of the implementation process. As in the first case, the interviews were recorded and transcribed and we used QSR NVivo qualitative analysis software for analysing the results.

After the interviews, we organised a workshop for nine key actors to promote dialogue. For the clinical pathway to function, it requires that every organisation takes a role in introducing it to all employees and starts to make changes in their operation models. It is also important to explain the significance and benefits of a clinical pathway to all employees.

The main goal of the workshop was to support the implementation of the new clinical pathway and to test and develop our gamified method. Workshop also aimed at visualising the situation from different perspectives (patient, emergency care team, nurse and doctor) and how the change would affect to it.

In the workshop, participants developed one story of a geriatric patient. The story was based on 5 events, chosen by the participants, from geriatric patient care pathway. Participants then examined new working method in this particular situation from the new clinical pathway document. In the next phase, the participants were advised to think working practices from the viewpoint of different actor. Participants randomly selected a card which represented one of the different actors. Like in the workshop held in the first case organisation, we used guiding questions to steer the process. The guiding questions in the profession cards were about how the professional would perform in this situation, what are the obstacles of acting in a new way and what are the benefits of this action. At the end of the workshop, a feedback from the participants was collected with questionnaire in order to evaluate our workshop and also to evaluate our gamified role switching method.

Through this gamified storytelling, we aimed at creating a clearer picture of what are the changes required in the organisations, how the change affects different actors, what are the elements in the clinical pathway document and what are the things that prevent the use of the clinical pathway. Altogether, through this role switching and implementing working practices, we aimed at promoting mutual learning and encouraging participants to take the clinical pathway to their organisation and eventually to everyday use.

3.2.2. Results from the interviews

The interviewed experts thought that the situation in their region is quite good compared to other hospital districts. However, they noted that a change in operation models is needed, because the population is ageing and more people are in the need of geriatric care. The interviewees had a common view that the clinical pathway was collected and created in a participatory way and that all the different viewpoints were acknowledged. However, because of the profound nature of the work, the interviewees thought that the clinical pathway document was too long and complicated and it was difficult to utilise in their work. They also

thought that this was the primary issue preventing the implementation of the clinical pathway.

The interviewees agreed that the work which was done to create the clinical pathway was valuable but the implementation work is going to be very difficult.

Expected impact

The clinical pathway for geriatric patient is going to bring benefits mostly to the patients, according to the interviewees. It was perhaps disconcerting that they didn't see so many advantages to the social and health care professionals if the new clinical pathway document is going to stay as it was at the moment of the interviews. The interviewees thought that the clinical pathway could be more beneficial to the professionals if it's divided into smaller more focused pieces.

Implementation

Some of the interviewed experts expressed their worry of the attitudes of the employees towards the new clinical pathway. They thought that the employees can easily think that the clinical pathway doesn't give anything new to them and the old ways of working are enough. The implementation was also challenging because there wasn't any single unit that was responsible for the clinical pathway or the implementation of it. It was the responsibility of every single unit and the organisation to introduce its employees to the clinical pathway.

The problem was that in order the clinical pathway to work as planned, it requires that it is used in every organisation. Because the benefits of using the new clinical pathway were so difficult to picture, it was likely that the implementation wasn't going to be easy.

3.2.3. Results from the workshop

To second workshops was evaluated the same way as in the first workshop. The participants filled out the questionnaire after each part of the workshop. Below we present the results of the questionnaires.

The participants of the workshop thought that the workshop was inspiring and promoted collaboration. Because the participants were from different units and organisations, they felt that truly different opinions and aspects were discussed.

Although collaboration and discussions were good, some participants felt that solutions to the identified problems were not found.

The workshop produced new ideas, collaboration, thoughts on what are the issues that need improvements and altogether broader understanding of the change. The workshop also revealed some critical points for the change process which were not recognized before. Our role switching method was enlightening for the participants and it was appreciated as a tool of see things from different perspective.

Visions and challenges are summarised in table 3 which was created the same way as in the first workshop.

Table 3. Identified vision and challenges in case 2.

Better results of patient care and ease of workload by enhancing the information flow between actors				
	Patient	Emergency care team	Nurse	Doctor
Vision	Will get the care she/he needs and hers/his needs are being heard	In addition to emergency care, the team informs all the relevant information to the hospital	Knows how to implement the clinical pathway for geriatric patients in flexible and comprehensive care	Knows how to implement the clinical pathway for geriatric patients and can make use of tools used by other professionals.
Challenge	Patients as a passive participant in care processes	Information is unavailable	Clinical pathway is not familiar and information blocks appear	All the needed information is not available

The top vision in the second case represents the idea of what are the benefits of the new clinical pathway for geriatric patients and what it requires. In the vision, patients will get the care they need and they are also seen as an equal partner in care. The role is new especially for elderly people who are not used to be demanding. Emergency team will pay attention much more on the information that is needed in the hospital. This information could be for example medication information. The problem is that all the information is not always available. For the nurses it is important to know the clinical pathway so that the geriatric patient will get special care that she/he needs. Geriatric patients' special needs are not known very well which could cause problems in later phase of the treatment. It is important for the doctors to use the information which has been gathered before to make right decisions of the care.

4. Discussion and conclusion

In our first case, new electronic medication storage was planned to be implemented in a hospital pilot unit. In the second case, a new clinical pathway for geriatric patients was about to be launched and implemented. In our research, we aimed at promoting change in the two case organisations and also to develop a new gamified role switching tool for promoting dialogue and mutual learning.

For this purpose we interviewed 25 social and health care professional from different organisations. The interviews had two aims. The first one was to give the employees and other actors a chance to tell their opinions of the change. Second, the interviews gave information to the researchers about the current situation and opinions of different actors. The interviews revealed that the attitudes towards the change varied. The varying attitudes were depending on the previous experiences of the changes in organisation work processes, expectations for the new change, the seen benefits which would result from the change and the

usefulness of the information that was given. In many of the cases, the interviewed experts didn't see or couldn't figure their role as a part of complex health care system where action of one professional effect to the other. The links between professions and organisations were difficult to understand and thus the importance and the action which was needed for the change wasn't clear.

The two gamified role switching workshops, together with the interviews, were in the focus of our paper. The aim of our workshops was to create dialogue and cooperation and give a possibility for the participants to see familiar everyday situations from another professions perspective. This way we aimed at toward mutual learning and thus promoting the change processes in the organisations. We summarised the visions and challenges identified from the interviews and the workshops to provide information to the organisations and help them to steer the implementation work.

Our results indicate that our gamified role switching method inspired and gave means for the participants to enhance systemic understanding of their organization and to improve dialogue. The health care professionals that participated in gamified workshops felt that they are involved in the change processes and that their opinions have an effect. Gamified elements in the workshops made the atmosphere inspiring and opened the mind for new viewpoints. The role switching method made the participants see the situation from the other perspectives and thus promoted collaboration and the change processes. The workshop and the discussion between participants didn't offer solutions to all the problems which were identified. However, solving all the identified problems wasn't the aim of the workshops, but rather to identify the problems, to offer different perspectives and to bring them to the discussion. From the experience of our workshop, we learned that some of the participants from the health care organisations want to see benefits of the event or means immediately. The problem in that is that our gamified solution aims to promote dialogue and mutual learning. The benefits of enhanced collaboration are difficult to demonstrate at that point. The experienced joy from the event may even emphasize the experience of missing immediate usefulness. Quite common belief in serious working life is that "what is fun can't be useful". We need to develop the approach so, that the participants more clearly learn what the benefits of playing are.

Our study indicates that it is useful to simulate being in the roles of others to enhance the understanding of a complex system where the actions of one professional affect the work of another one. We argue that these effects can help to reveal the issues related to organizational changes and also to provide solutions for dealing with them. As many organizations struggle with various obstacles when attempting to improve their activities, gamified solutions can be a valuable tool for assisting the implementation of changes.

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Transforming health care through niche service innovations - the perspective of institutional entrepreneurship

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Although digitalization has profoundly changed the business logic in many industries, health care sector still operates in many areas as in the pre-digital era. During the recent years we have witnessed the rise of new digital health ventures, many of which have revolutionary ideas how to transform the business logic in the health care. However, in many cases the institutional logics in the field of health care are so strong that new ventures have major challenges in breaking these institutional barriers that prevent introduction of digital service innovations. This paper explores how five case companies aim to transform their specific niche area in health care. We analyse actions and the role of digital health ventures in this transformation through the theory of institutional entrepreneurship.

1. Introduction

During past 20 years ICT has profoundly changed our everyday lives and transformed business logic in several industries. On the one hand, digitalization has initiated massive transformation in several, previously product-oriented, industries e.g. digital distribution of software, music and movies. Hence, information intensive goods are starting to behave like services or “as-a-service” (Ng, Vargo, & Smith, 2012). On the other hand, digitalization is transforming other industries such as banking from physical service activities to standardized digital services that behave more like goods (Ng et al., 2012). Despite digitalization in health care has progressed at much slower pace than in the banking sector, policy makers across globe are now looking to digitalize health care system in order to make it safer, more affordable and more accessible (Agarwal, Gao, DesRoches, & Jha, 2010).

The renewal in health care was for long understood as the adoption of new medical tools and drugs (Djellal & Gallouj, 2008). At the same time service innovations, which aimed to change heavily institutionalized structures and practices, seemed to be very rare and face considerable institutional barriers. However, now it finally seems that digitalization has also started to profoundly reshape health care sector, where the major pressure for change in sociotechnical regimes (see Geels & Schot, 2007) comes from two direction. Firstly, major changes at the landscape level, for example, to age-dependency ratio and spiraling health care costs, have created urgent need to rethink how health and social care service delivery is organized more effectively. Secondly, the sharp rise in new ventures that are aiming to introduce digital health service innovations to specific niche areas (digital health ventures) act as institutional

entrepreneurs (Battilana, Leca, & Boxenbaum, 2009) building up internal momentum for major changes.

While the role of institutional entrepreneurs in the process adopting radical technological innovations is widely acknowledged (Pacheco, York, Dean, & Sarasvathy, 2010), there is surprisingly little research on the institutional entrepreneurship in health care domain. With this paper we aim to increase the understanding of the institutional barriers and entrepreneurship in the context of health care, and provide new insights into the ongoing digitalization in health care from the perspective of digital health ventures. Objective of our study is to explore and explain how these ventures pursue to introduce service innovation to the health care systems by acting as institutional entrepreneurs, and how multiple institutional logics (DiMaggio & Powell, 1983) in health care domain promote and/or resists the change.

2. Related research

2.1. Barriers and opportunities for change in health care

Literature related to the barriers for adoption of information and communication technologies (ICT) in different industries is voluminous, and there has been particular interest on challenges on adoption new ICT-enabled innovations in the field of health care (see reviews Gagnon et al. 2012; Li et al. 2013). Study of Dehzad et al. (2014) is one of the most recent papers that analyses barriers for transforming the logic of health care from treatment of diseases to the prevention of diseases. Their study identifies key barriers for the adoption of mobile health, where three main barriers are integration and interoperability with existing health IT systems, business case and conservative culture.

Although the challenge of initiating and implementing institutional change is often only indirectly covered in the technology adoption and innovation literature, there is extensive literature on this subject that builds on research of institutional theory. From this theoretical viewpoint barriers and opportunities for institutional change can be viewed as the likelihood that organizational field will permit actors to identify and introduce new institutional arrangements and to mobilize resources required to make the transformation enduring (Dorado, 2005). Hence, implementing the *divergent change* that requires breaking existing institutional arrangements and entails “loosening” other actors’ institutional embeddedness can be very challenging due to the institutional inertia (Battilana et al., 2009; Levy & Scully, 2007). Moreover, those actors who benefit from the status quo (“institutional defenders”) almost invariably arise to defend existing set of beliefs, practices and processes at the field and can use counter-strategies trying to protect their established position within the field (Battilana et al., 2009; Levy & Scully, 2007).

2.2. Institutional entrepreneur as a change agent

Eisenstadt (1980) was the first to use the notion of institutional entrepreneur to characterize actors who serve as a catalyst for structural change. Building on Eisenstadt’s work DiMaggio (1988) introduced the concept of institutional entrepreneur-

ship in institutional analysis, with an aim to provide explanation how actors can shape institutions despite pressures towards stasis (Leca, Battilana, & Boxenbaum, 2008). Since the early work of Di Maggio, research on institutional entrepreneurship has grown into compelling and diverse literature that focuses on the self-interested agent who commands and mobilizes resources to alter or create new institutional structures (Pacheco et al., 2010). Two main research streams that are focused on the concept on institutional entrepreneurship are sociology-based institutional theory and economics-based institutional economics. Whereas institutional economists considered institutional entrepreneurs as self-interested agents that influence on the transformation of institutions to capture economic benefits (North, 1990), institutional theorists have very limited discussion related to economic motivation per se (Pacheco et al., 2010). Although these concurrent streams have many common characteristics those are mostly unlinked with each other. Furthermore, neither stream has extensively embraced rich literature on entrepreneurship (Pacheco et al., 2010).

Study of Battilana et al. (2009) is one of the rare papers that aims to bridge gap between institutional theory and academic stream of entrepreneurship. They define institutional entrepreneur as a change agent (individual, group of individuals, organization or group of organizations) that must fulfil two following conditions: (1) it initiates divergent changes i.e. changes that break the institutional logics within the given institutional context; and, (2) actively participate in the implementation of the change. In order that the divergent change can be implemented, institutional entrepreneur has to be able to craft a vision for the change in terms that appeal to the actors needed to implement it (Battilana et al., 2009). Additional, as the diffusion and legitimation of institutional change requires mobilization of support and acceptance of multiple actors, it is crucial that institutional entrepreneur has access to various types of resources needed in this (e.g. cognitive, social and material resources) (Dorado, 2005).

3. Methodology

3.1. Research design

This research adopts a qualitative research approach, using a case study approach. Case study is especially suitable as a research method in this context due to the high complexity of the phenomenon and early stage of this field of inquiry (Yin, 2009). Also, our study can be categorized to micro-approach of innovation, focusing on study of individual actors, especially on entrepreneurial founders and teams (Garud, Gehman, & Giuliani, 2014).

Data for the study was collected in form of 28 narrative interviews from which nine interviews were included in final cross-case analysis that is presented in this paper. Interviewees represented managers of five companies, which were developing digitally-enabled service that was supposed to transform specific niche area of health care system. Following table describes the case companies and the contexts of which they operate and aim to transform.

	Institutional context	Number of inter-	Main level of institutional	Institutional entrepreneurs	Maturity of the company / growth
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		views	barriers		phase
Firm A	Ophthalmology	4	Policy and practice level	Company	+ 5 years / International growth
Firm B	Diabetes treatment	1	Policy, standard, and practice level	Company	+5 years / International growth
Firm C	Mental care	2	Policy, standard and practice levels	Entrepreneur/company	2-5 years / trial phase
Firm D	Neuroradiology	1	Policy, practice level	Company	0-2 / early sales phase
Firm E	Treatment and prevention of chronic diseases	1	Policy, standard and practice level	Founder of the new venture	0-2 years / building the solution phase

Table 1. Data related to case companies

3.2. Research questions and data analysis

We began the analysis with an analysis of 20 cases through the lens of our research questions:

1. What are the main institutional barriers experienced by new digital health ventures aiming to introduce innovation at the health care market?
2. What is the role of institutional entrepreneur in initiating and implementing the institutional change (digital transformation) in the field of health care?

From the 20 cases we selected five cases in which there were 1) clear institutional barriers, 2) there was clearly needed role for institutional entrepreneurs, and 3) digital health venture played an important role in the initiating and promoting the institutional change in some specific field of health care. These case companies were from Ireland, Belgium, Netherlands, and two of them were from Finland. Data from each individual case were then analyzed in-depth with help of content-based coding of narrative interviews.

After each case was analyzed individually, we turned to cross-case analysis with an aim to identify consistent patterns and themes between cases. Our analysis followed iterative process of cycling between theories from existing literature on institutional entrepreneurship and the interview data in order to refine our findings and finally developed those into implications for practitioners and academics.

4. Five cases on new ventures aiming for digitalization of health care

In the following five individual case studies are introduced, each of which are from the specific fields of health care. With help of these cases we aim to explore and explain various types of institutional barriers for the introduction and adoption of new digitally-enabled health service innovations. Moreover, we focus on the role and strategies of digital health ventures as institutional entrepreneurs who pursue to initiate and promote the change.

4.1. Case A – Changing institutional logic of ophthalmological professionalism

First case is focused around the technological innovation that enables cheaper and easier treatment and prevention of eye diseases. One particular challenge in this case was that treatment and prevention of eye diseases and therefore the institutional logic of ophthalmological professionalism vary notably between different countries even within the European Union. Therefore, in some countries changing existing logic of ophthalmological professionalism, which requires more radical transferring of clinical task from one group of medical professionals to other, can be considered to be greater barrier for change. Other major barrier is the logic how many countries still reimburse medical professionals based on the treatments given at the clinic, not including telemedicine consultations.

In this case there was clearly seen how existing institutional logic may be protected by the medical professionals who feel threatened by the change. As an example, one of the interviewed persons told that the union of medical professionals acted very actively in order to prevent the transfer of clinical tasks from ophthalmologists to other health care professionals, which would have enabled new type of business to be created.

On the other hand, a company had managed to create contacts with some key opinion leaders who were highly renowned medical professionals in this field. These key opinion leaders saw new technology as an opportunity for divergent change and they acted as institutional entrepreneurs by actively pursuing to change the institutional logic and actively promoting this change.

4.2. Case B – Initiating the change in the reimbursement of out-patient diabetes treatment

In the second case new digital health venture had created innovative solution for diabetes management that solved the problem of measurement more conveniently than previous existing solutions. In addition the new solution aimed to improve communication between patient and health care professionals, which required the changes in institutionalized practices of the patients and medical professionals related to diabetes treatment.

Besides the need for changing the behavior of the patient and medical professionals, one main institutional barrier that the company faced was the current way how diabetes management devices were procured within the existing health care system. The problem was caused by the fact that new solution was much more expensive than the existing solution, since it was much more technologically advanced. However, as the price was one of the main decision criteria when health care providers procured diabetes management solutions, company couldn't sell new solution without first changing rules and standard procurement practices.

From the perspective of institutional entrepreneurship, one of the most crucial moves of the company was the recruitment of famous medical professional from field of health care that specializes in diabetes treatment. With help of this key opinion leader company was able to promote the introduction of new innovation and institutional changes required to be implemented within the health care system. With help of the key opinion leader company was also able to form group of diabetes treatment specialists that promoted new type of diabetes management around the world. Hence, the major part of company's success was hiring the person who had expertise and legitimacy in the eyes medical decision makers, and who could therefore provide insights how diabetes management of the future should be done.

4.3. Case C – Introducing eHealth to mental care

The third case company aimed to change institutionalized practices of providing mental care. Their innovation aimed to improve the communication between patient and health care professions during the outpatient care, and one of the key features of the solution was also self-treatment for the patients to prevent relapse in-between the periods of intensive treatment. As a result one of the potential barriers for the adoption was identified to be health care professionals who are afraid that the e-health application would eventually reduce their work and income.

The manager of the company stressed in the interview that it is not possible to change the way how mental care system works if you don't have good relationships with the right people. The company had been lucky to utilize expertise and connections of the person who had retired from high position at the big mental care institution and therefore possessed very good connections to the management boards and decision makers. Hence, the company was able to act as an institutional entrepreneur with help of the person retired from mental care management position. In order to promote the institutional change, company acted also very actively in different types of the media and aimed to create connections with different types of the key opinion leaders in the field.

4.4. Case D – Automation of the analysis of neurological images

The fourth company aims to radically improve the way how certain neurological diseases are diagnosed. It seems to be inevitable that the institutional logic related to the diagnostics, which has been strongly based on medical professionalism, will be changing radically as the speed, accuracy, and reliability of computer-based analysis will continue to improve. Since this means that the manually conducted clinical tasks are transferred from the medical professionals to the computer, institutional barriers

for implementing this kind of a change can be relatively strong. However, the case company had so far worked mostly with medical professionals who would be classified as innovators or early adopters (Moore, 2014), and therefore the company didn't have clear understanding how strong the resistance for the change would be when service would need to be adopted by the majority of medical professionals.

The company was acting as an institutional entrepreneur with help of key opinion leaders in the field of neurology. Company had been able to create relationships with key opinion leaders, for example, through joint research projects. Important resource in the successful preparation research project had obviously been that the founders of the company had very high academic degrees and had already established good personal networks in the academic world before the company was established. Hence, the previous institutional context of the founders enabled them to act as institutional entrepreneurs in this field.

4.5. Case E – Digital physical activity prescriptions and monitor the results

The fifth company develops application that enables medical professionals to provide physical activity prescriptions and reliable information for the patients. Application provides also activity monitoring and channel between medical professional and patient, which aims to improve the benefits of prescribing physical activity. As a result, the company aims to advance the transformation from the treatment of chronic diseases to the prevention of those. However, as the whole health care system in many countries has been built on the treatment of diseases, the biggest obstacle for implementing the change are institutionalized practices of the health care providers.

Also this company can be seen as an institutional entrepreneur, which aims to initiate divergent change in institutional logic of the field, and actively participates in the implementation of this change. The most crucial point why the company can act as an institutional entrepreneur is based on the founder's previous work and education through which she is very familiar with institutional context of physiotherapy and exercise science and has good contacts in this field. Although company is very young, they have been already able to initiate notable trials with key players in their home market.

5. Discussion and conclusions

Findings of the study explore how digital health ventures, which aim to introduce new kind of a business logic into health care, respond to challenges that they face when they also need to transform institutional logic of health care system as it conflicts with the new business logic. Through the cross-case analysis of five case studies we identified institutional barriers ranging from professional practices (practice-level), to voluntary set of rules that direct the behavior within the specific health care sub-field (standard-level), and government policies that regulate the specific institutional field or even the whole field of health care (policy level) (Pacheco et al., 2010). In the following we discuss about the institutional barriers at these three levels, and elaborate different roles of institutional entrepreneurs in the implementing the change.

5.1. Policy-level institutional barriers – Changing the formal rules of the game

The case companies selected in the study were aiming to transform health care system from the treatment of diseases towards more prevention-based system. Although this type of transformation is widely present in the speeches of policy makers, in many countries transformation towards prevention-based health care requires so systematic change of the system that it is extremely difficult for individual actors to implement the change. Moreover, many actors who have good position in current health care system defend their position, which creates resistance for the change. Hence digital health ventures have very limited capability to mobilize resources needed for the change. Therefore, those companies whose business logic is built on new prevention-based institutional arrangements are playing with high stakes; they must be able to seize the right moment of the policy change, change their business logic, or they are likely to lose big.

In addition to challenge of making transformation towards preventive care, also the inertia of implementing regulative changes related to the reimbursement of care provided through Internet (eHealth) or mobile phone application (mHealth) was experienced to be a main barrier for new business. Institutional entrepreneurs felt that they were able to better influence on this needed change, but the transformation was very slow and some countries were clearly lacking behind, which made international business more challenging.

Other formal rules that were hindering the introduction of certain service innovations were related, for example, to the laws and regulations governing what certain kind of treatment different type of professionals are allowed to conduct. This issue may also be particularly challenging for companies aiming international markets as the role of different professionals and regulations governing their role differ between different countries and therefore same business logic may not be possible even within the different countries in European Union.

5.2. Standard-level change: Transforming informal rules of the game

The field of health care is full of informal 'standards' which provide relatively strict normative guidelines on, for example, what is the available set of potential care procedures and what is the role of different professionals in this process. This is the area in health care where highly legitimate institutional entrepreneurs may more easily manage to change institutional arrangements. However, as the field of health care is very professionally oriented, many of the case companies had found out that they need to mobilize top-rated medical professionals as key opinion leaders (KOL) to promote the new innovation. In addition, they need to be able to provide clear evidence that the innovation requiring new institutional arrangements results in improved end result compared to the old way of accomplishing the same task.

In case of changing the 'standardized roles' of different health care professionals some companies had experienced or were expecting strong resistance from the field. Traditionally, the field of health care is very hierarchic and it is not allowed to transfer tasks of the higher-level professionals to professionals with lower level of education. Moreover, the health care is largely still based on institutional logic of medical profes-

sionalism, and hence the transformation that aims, for example, to digitalize analysis health data and thereby let computers do the work of the professionals can be experienced in very negative way and lead to strong resistance. Therefore, if business logic is based on transforming tasks from one level to another, or from professionals to computers, institutional entrepreneur should be very careful when communicating the vision, and should preferably use motivational framing (Misangyi, Weaver, & Elms, 2008) to provide strong compelling reasons so that all central actors can support the new vision.

5.3. Practice-level change: Changing the institutionalized practices in the field of healthcare

Third and most easily approachable level of institutional change is related to the change of practices in the field. Unlike standards it may not be that crucial for the actors to follow the certain practices. Nevertheless, since practices help to reduce the cognitive load of actors, reduce uncertainty, and cope with the task at hand more easily, institutional entrepreneurs may have to provide clear and compelling reasons on why new practices are needed.

Institutional entrepreneur should also expected different kind of response from different actors regarding the change of practices. Whereas tech-savvy patients and professionals may be more willing to adopt new practices related to digitalization of health care, medical professionals and patients belonging to late majority or laggards (Moore, 2014) may be much more reluctant to learn new practice and change their behavior. This is particularly important when aiming to diffuse ICT-enabled innovation to whole range of users, as trials involving new ICT-enabled services are often biased by having more innovators and early adopters as users, which may give false positive picture. True test whether the institutional logic can be changed is when the behaviour of early and late majority is pursued to be changed.

6. Conclusions

The first aim of this paper was to explore the institutional barriers that new ventures face when introducing ICT-enabled service innovations to health care markets. Our findings from five case studies suggest that it is important to identify that institutional change is required at different institutional levels: policy, standard and practice-levels. In addition, companies face various challenges when aiming to transform multiple levels of institutional logic at the same time. Some of the challenges may be easier to deal with, such as, digital transformation requiring institutional change in the level of practices – especially if users are tech-savvy professionals and/or patients. However, our findings suggest that policy level change requires substantial work and may not be implemented without strong support.

As a result, role of institutional entrepreneur is crucial in the introduction of new innovations. Institutional entrepreneurs are individuals or organizations who have motivation to initiate change in institutional logics, and who are able to mobilize resources for implementing the change. Hence, in order that an entrepreneur or startup compa-

ny can be considered as an institutional entrepreneur the actor needs to have proper legitimacy to mobilize resources needed to implement the change.

We hope that this paper provides new insights for managers of entrepreneurial ventures that are targeting to the digital health markets. Our aim is also to advance service research by integrating theory of institutional entrepreneurship more tightly in the discussion of service innovations. As this paper is just a beginning of our research in this area, we hope that more detailed analysis of broader data set will bring further insights and better theoretical understanding on the institutional entrepreneurship in the field of health care. Finally, the aim of the further research will be to improve our understanding and capability to introduce systemic health care innovations in organizational fields where multiple institutional logics co-exist (van den Broek, Boselie, & Paauwe, 2014).

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Frameworks towards a virtual co-creation tool for fuzzy front-end of service development in health care context

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This paper combines entrepreneurial behaviour and innovation with design thinking in order to investigate the use of the IdeaWindow, the ict-based tool planned for employee-driven service development, in a health care organisation. The tool enables participation of heterogeneous group of people to fuzzy front-end of service development. The paper asks how virtual tool can be used for tackling the unknown - tacit knowledge, hidden possibilities and initiatives in this context. What kind of perspectives and topics the employees bring up when using a virtual tool in the front-end of service development. The results are based on IdeaWindow entries and electronic survey data collected in Finnish hospital ward.

1. Introduction

The public health care sector in Finland and other Nordic countries is facing many challenges. These include aging population and changes in the composition of population health. There are more patients with multiple traumas but also new health care challenges caused by changing life styles. The expectations of patients for better and more individualized care have also grown during last years. Rapid technological and medical development is increasing costs but also expanding the treatment for patients that previously could not been treated (Magnussen et al., 2009; Länsisalmi et al.; 2006; Varkey et al., 2008). At the same time reduction of expenditure in the public health services put pressure to increase efficiency and productivity.

The need for innovation in the public sector is widely recognised. Innovation is considered an important mean for promoting welfare and resolving efficiency demands (Saari et al., 2015; Sørensen; Torfing, 2009). In health care sector the need for innovation has become critical to enhance quality of care and there continues to be a quest to balance cost containment and health care quality (Omachonu; Einspruch 2010; Varkey et al., 2008).

Despite the importance, the generation of innovations and their adoption in health care organisation is often complicated (Länsisalmi et al, 2006). Hospital, which is the environment of our study, is considered to be a very complex and hierarchical social organisation. There have been claims that hierarchies and authoritative management styles have caused rigidity in work practices especially in hospitals. The boundaries between different professions are precisely defined and based on the education and certificates. These strong boundaries between work roles affect the renewal and innovation practices in hospital wards (Iedema, 2007). Restricted domains of responsi-

bilities and authority can cause limitations in the abilities to imagine renewals that touch several professional groups and several cross-functional operations.

In the heart of innovations in healthcare there are the needs of the patients and the skills of the healthcare practitioners. According to Omachonu and Einspruch (2010) *“healthcare innovation can be defined as the introduction of a new concept, idea, service, process, or product aimed at improving treatment, diagnosis, education, outreach, prevention and research, and with the long term goals of improving quality, safety, outcomes, efficiency and costs.”* Successful healthcare innovation focuses mostly on three areas 1) how the patient is seen 2) how the patient is heard and 3) how the patients' needs are met. This rises up the importance of healthcare workers in innovation processes. They see and meet the needs of patients in their daily work practices. Innovation requires the activation of corporate entrepreneurs who will articulate problems, opportunities and possible solutions and will exploit the windows of opportunities (Sørensen; Torfing, 2009).

Since, as described it is not always easy to act entrepreneurially and strive for renewal in hospital environment, we experimented if ict-based tool could promote initiative and innovativeness. In this research paper we combine entrepreneurial behaviour and innovation with design thinking in order to investigate the use of the Idea Window, the ict-based tool planned for employee-driven service development (Lahtinen et al., 2014). Idea Window was originally developed and tested together with the health care workers in research project during years 2012-2014. We will investigate how employee-driven service development can be initiated by the virtual co-creation tool. Employee-driven innovations are exploration and exploitation of new processes and work practices that originate from ordinary employees. We are interested to know how virtual tool can be used for tackling the unknown - customer needs, tacit knowledge, hidden possibilities and initiatives in the working life context. We explore what kind of perspectives and topics the employees bring up when using a virtual tool in the front-end of service development.

Our main questions are: 1) How and by whom the virtual tool is used in fuzzy front-end of open and unstructured innovation process? 2) What kind of initiatives are raised up and which proceed into brainstorming phase?

The paper is organized as follows. In the literature review we will shortly describe the core concepts of the paper: employee-driven innovation, fuzzy front end, effectuation, corporate entrepreneurship, collective creativity and virtual co-creation. In the following section, the case selection and the characteristics of the case, action research as a method for data gathering and the principles of data analysis are presented. From there we will continue to the findings, followed by the discussion of the value and implications of the virtual fuzzy front end innovation practices among employees identified as well as some future research opportunities.

This research is part of the project called Entrepreneurial renewal and design thinking in the organisational development funded by the Finnish Funding Agency for Innovation. The aim of the project is to help the organizations to identify and utilize the workers' tacit knowledge and vocational know-how, and to incorporate their ideas to the developing of new services or work practices. The project examines the employee-driven renewal of organizations from entrepreneurship and design thinking perspectives.

2. Literature

Our case study focuses on those parts of fuzzy front end (FFE) of innovation process that take place and are mediated by IdeaWindow. Some key tools to fully understand what happens in these situations are concepts like effectual logic, corporate entrepreneurship, collective creativity and co-creation. The concepts are linked to different elements of FFE in different ways. Collective creativity is perhaps most prominently (but not only) linked to idea generation, effectual logic to the idea selection, whereas corporate entrepreneurship to opportunity identification and selection and development elements. The element of co-creation is present in each element. These concepts are also interconnected and overlapping - the concepts of creativity, innovation and corporate entrepreneurship are all linked to each other (Fillis; Rentschler 2010). In the following we will have a closer look at the role of these elements in early phases of employee-driven innovation.

2.1. Employee-driven entrepreneurial renewal and fuzzy front end

In order to develop the work practices and service processes, tacit knowledge and skills of the workers should be incorporated to the innovation process. Incorporating the employees - the experts of their own work - into innovation activities, can be seen as co-creation aiming to **employee-driven innovation (EDI)**. By definition, EDI is a new idea created by employees which results in a new, shared, and sustainable practice (Kristiansen; Bloch-Poulsen, 2010; Hoeve; Niewenhuis, 2006; Feldman; Pentland, 2003). Most commonly innovation refers to commercialized invention like a new technology, product or process. Here, the concept is wider. By innovation we understand both radical and incremental renewal of the products and services, processes and work practices alike (Wolff; Pett, 2006).

The innovation process can be divided into three stages: front end innovation, new product and process development and commercialization (Koen et al., 2001). The early phase of development process has been called the **fuzzy front end (FFE)** (Smith; Reinertsen, 1991) or front end of innovation (FEI) (Koen et al., 2001). Characteristic to that phase is that there is no clear objective, no schedule, or no budget, and hence no plan to follow. The nature of work is experimental and unstructured. Despite the fuzziness of this phase, some common elements of the FFE have been identified. According to Koen et al. (2001) FEI – as they call it – consists of five elements, which are idea genesis, opportunity identification, opportunity analysis, idea selection and concept & technology development. Idea genesis can precede opportunity recognition or vice versa. What comes out from the FFE is not certain, since not every idea – and not even every novel and useful idea – gets implemented and utilised in a profitable way (Amabile et al., 1996; Fillis; Rentschler, 2010). Hence, only some creative ideas turn into innovations. Therefore, uncertainty is characteristic for the fuzzy front-end of employee driven entrepreneurial renewal (Smith; Reinertsen, 1991). The end product of the renewal process is still unknown at that stage and the uncertainty of the process is quite similar to business start-up process (Phan et al., 2009) even though the amount of risks and employees role as a risk bearer is different (da Costa; Brettel, 2011).

Effectuation theory (Sarasvathy, 2001; 2008), which was originally created to describe start-up process, offers a useful tool for our study to understand the entrepre-

neurial behaviour of employees under uncertainty. Effectuation is a “*general theory of decision making in uncertain situations*” (Sarasvathy 2008, 227). It is a way to proceed in a situation with a given set of means and focus on selecting between possible effects that can be accomplished with that set of means (Sarasvathy 2001). Effectuation logic and causation logic have been contrasted. Some of the recent studies show that they are more complementary than contradictory (da Costa; Brettel, 2011). In the literature four dimensions of effectuation have been identified. Those are means, affordable loss, partnerships, and acknowledging the unexpected (Sarasvathy, 2008). What that means, is that means available determine potential outcomes more than conscious and explicit planning, potential losses are kept in affordable level, other actors are regarded more as potential partners than competitors and contingencies are seen as valuable opportunities. The characteristics of effectuation - such as process driven by given means and contingencies are seen as source of opportunities - are better suited to the FFE of the innovation process, whereas the characteristics of causation logic - like process steered by given targets and expected returns, and the avoidance of contingences - are more in line with the new product process development. (Brettel et al., 2012.) In our case it is interesting to see, if the staff of the ward build their ideas and proposals based on existing resources or do they use causation logic by setting an aim and then thinking what is needed to achieve that aim.

Effectuation logic, fuzzy front end and corporate entrepreneurship are closely linked with each other, as well. **Corporate entrepreneurship (CE)** has been seen as a method of stimulating innovation and utilizing the creative energy of employees in benefit of the organization (Åmo; Kolvereid, 2005). There are several definitions for CE (Hornsby et al. 2002). Simply put, CE can be seen as entrepreneurial activities within an existing organization, or as Sharma and Chrisman (1999, 18) define: “*the process whereby an individual or a group of individuals, in association with an existing organization, create a new organization or instigate renewal or innovation within that organization*”. What does entrepreneurial behaviour look like? How can we recognize entrepreneurial behaviour of teams or individual employees? Entrepreneurial orientation (Lumpkin; Dess, 1996, Dess; Lumpkin, 2005) is one conceptual tool for that. There are some patterns of action that can be identified as entrepreneurial. Those are autonomy, innovativeness, proactiveness, competitive aggressiveness, and risk-taking. There are some organizational factors fostering CE. Those are work discretion, time availability, management support, rewards or reinforcements, and organizational boundaries (Hornsby et al. 2002), some of which are quite scarce in hospital environment. Even if corporate entrepreneurship is often grass root level action, it has mostly been studied from the managerial perspective (Heinonen; Toivonen, 2007). This study aims to partly fill that gap.

As well as there are organizational factors fostering CE, there are **work environment factors** that affect the level of creativity. Commonly mentioned are encouragement of creativity, autonomy or freedom, resources, pressures, and organizational impediments to creativity (Amabile et al. 1996). Motivation for work and creativity was also noticed as an essential factor behind collective creativity already in the seminal work of Teresa Amabile (1988, 1996). In recent years, the interconnectedness of innovation and creativity has been studied on several levels: individual, team, and organizational level. Team level creativity has been shown to be dependent on team climate and processes and leadership style used. However, recent studies have shown no clear dependence between team structure and composition and innovation. (Anderson et al., 2014.) In their review, Lämsä et al (2006) point sever-

al internal factors that facilitate innovations in healthcare organisations. These include: strong leadership, shared and clear objectives, task orientation, participative safety, reflective team practices, active internal marketing, correct timing, motivation and participation of personnel, lack of stress, and sufficient resources.

2.2. Co-creation and co-realisation as a part of FFE

Collective creativity and co-creation as a manifestation of collective creativity are needed in the FFE. Sanders and Simons (2009) define co-creation “as any act of collective creativity that is experienced jointly by two or more people”. But first, in order to be able to co-create, some creativity is needed. There are several definitions for creativity. Fillis and Rentschler (2010, 51) define it as “*showing imagination and originality of thought in moving beyond everyday thinking*”. Hence, creativity entails an ability to ‘think outside the box’ and combine diverse information from different domains. As one element of EDI, the concept of bricolage is relevant when looking at innovations which arise from the daily practises of employees. According to Fuglsang (2010) bricolage can be seen as a ‘do it yourself’ problem solving that creates structures out of events and opens spaces for new ways of doing things. Saari et al (2015) states that ‘bricolage is the process of co-shaping an emerging path: various actors offer inputs to generate virtuous learning circle’. Learning by doing and through interaction, recombining previously unrelated knowledge, building skills and expanding routines are all at the core of bricolage. In this respect the IdeaWindow works well, since it enables multi-professional co-creation and supports cross-domain learning, which is regarded important for collective creativity (Hirst et al., 2009).

According to Elizabeth B.-N. Sanders (Simonsen; Robertson, 2013) “**Co-creation** puts tools for creativity and communication in the hands of the people who will be served through design. It is only through collective thinking and acting that we will be able to use design to help address the challenges we face today. All people are creative and can participate in co-designing if they are provided with relevant tools and the settings for use.” This view refers to participatory design that has recently paid more attention to long-term collective thinking and acting, and collaborative development processes where jointly designed tools enable dialogue between designers and users and give power of the tool and process development to the users.

In **participatory design** technology is seen as a potential mediator interweaving meaningful connections within wider socio-material system between people, objects and processes (Suchman 2002; Björgvinsson et al. 2010). Recently, the particular attention has been paid to application of participatory tools and techniques in the front end of the design process. Co-creation has been found to be even more relevant at the early front end of the design development process, where probes and generative toolkits operate well (Sanders and Simons 2009).

Co-realisation (Hartswood et al. 2002; 2007) is a concept stemming from information systems development, where it means continuous co-creation between designers and users. It aims to create a shared practice between users and designers that is grounded in the experiences of users, and where users drive the process. The key issue in co-realisation is to support ‘design-in-use’ (Henderson; Kyng, 1991), and in recognising that the information technologies and work practices co-evolve over time and that new technical artefacts require effective configuration and integration with work practices (Blomberg; Karasti, 2013). Traditional approaches to technical

systems design assume that systems are designed by technology professionals, and that at the end of the design process the implementation is finished and the properties fixed, and finally they are ‘handed over’ to users (Blomberg; Karasti, 2013). Thus the requirements somehow pre-exist, as something that can be ‘captured’ through appropriate ‘requirements-gathering’ methods (Jirotko and Goguen, 1994; Woolgar, 1994). *Rather, requirements are seen as being constantly evolving and in need of being ‘worked-up’ and regularly revised in the light of the situation at hand* (Blomberg; Karasti, 2013). Co-realisation is well in line with our approach both for IdeaWindow development as well as EDI processes supported by the IdeaWindow – with an exception that in EDI processes the ‘designers’ and ‘users’ are the employees themselves.

Case-based prototypes convey design ideas while maintaining their relation to work practices. In addition to providing for the possibility to iteratively gain user input throughout implementation, assessment and redesign; the prototypes also offer the context for discussion and mutual learning. The case-based prototypes allow potential future directions to be assessed in relation to other technologies-in-use, as individual technologies are seen to ‘add value’ to the extent they work together in effective configurations (Blomberg et al., 1996; Trigg et al., 1999). IdeaWindow is developed through case-based prototypes, which are co-created in various work places in different industries.

3. Method

3.1. Case: IdeaWindow at the hospital ward

The empirical study is based on a multidisciplinary action research project realized in a large public sector health care organisation in Finland. The case study was realized at the gynaecological ward of Tampere University Hospital in the Pirkanmaa Hospital District in co-operation with the group of personnel of three units chosen to the research project in the hospital, and with the Development Director of FinnMedi who was responsible for the co-operation during the action research.

The ICT-based co-creation tool called Idea Window was developed in a previous project in 2012-2014 at this very same hospital ward. It was designed to be a grass-root level open communication and development tool for employees’ concrete ‘doing’ from real needs of the workers and patients, aiming to empower the grass-root level professionals as developers and innovators of their work and domain. In the previous study, where the Idea Window was co-designed with the group of nurses and doctors, the prototype was preliminary targeted for employees to detect the invisible side of their work and to observe their experiences and ideas relating to services, and to pay attention to the customer's service experience and behaviour. It was to be a tool for tackling the unknown – customer needs, user understanding, tacit knowledge in work, hidden possibilities and initiatives in work context – and to collaborate in a more systematic way. (Lahtinen et al., 2014.)

In busy environments such as hospitals, it is difficult to get personnel to break away from the everyday work for example for bringing up new ideas and views on a variety of development challenges they face in their work. In the project, the IdeaWindow

was tested as a prototype to find out if a simple and easy-to-use kind virtual co-creation tool could 1) help employees to see their work more from the developer or designer point of view by providing them with a channel for sharing their ideas when possible along with their other work, and 2) to be initiative in the work even though there wouldn't be any clear objective or plan to follow for bringing up and sharing their ideas, experiences and thoughts for improving work life. (Lahtinen et al., 2014.)

The previous action research indicated that health care professionals are motivated to participate in designing and using service development tools and methods 1) if the process is based on meaningful and practical frames which matter to health care professionals, 2) if the process fits with contextual restrictions of health care organisation, 3) and if employees have possibilities to modify the process and monitor the impacts and to apply the results in multiple ways. (Lahtinen et al., 2014.) In the current study the situation where the data and results are obtained is a bit different, now the employees can use ready-made instrument for recording their own ideas and proposals for improvement and so starting their own co-creation process.

The project team made a decision with the contact persons in the hospital to widen the use of the virtual co-design tool IdeaWindow in the units chosen for the first experiment. The employees of the units hadn't used the IdeaWindow before although the tool was originally created in collaboration with personnel working in the same department in the previous research project. Therefore, they might have heard something about the device.

This time the IdeaWindow was taken into use in the units without any precise guidance or control. The personnel had relatively free access to try the device and come up with different ways to use it. No certain purposes or objectives were given to them. The only limiting thing that was told concerned the hope that the prototype would be used for developing both individual and co-operative work in the units. The project team allowed personnel to decide topics for their shared ideation and creation.

From the perspective of the 'design-in use', the main objective in the experiment was to explore how the virtual tool could work if the employees are let to use it experimentally and in unstructured ways for their own idea genesis, opportunity identification and opportunity analysis, the three elements typically existing in the front-end of innovation. The experiment would also indicate how well the tool fits with the contextual restrictions of health care professionals. Thus, the research focus would be on how the employees are using the tool alongside their everyday work routines and hectic working hours without exactly defined development case or topic, and without ready-made processes and methods triggering ideas and thoughts into actions.

The Idea Window has been designed to be easy-to-use touch screen computer with simple user functions on the graphical user interface which would be easy to find and available all the time (see Figure 1). It was designed as a platform for workers' findings, initiatives, ideas and solution proposals to develop services. In the Idea Window, employees can enter their observations and ideas on the screen. In addition, an employee can propose solutions and experiments related to the findings and observations of the service experience. All the items can be combined together to form a variety of topic clusters on the screen. Employees can modify and store the clusters in the user interface according to what is meaningful to them. Any employee can anonymously leave a proposal in the Idea Window and read and move the items on

the screen. The Idea Window was originally designed to put the patient at the service path clearly visible and to open the view into the customer's service experience. (Lahtinen et al., 2014)



Fig. 1: The IdeaWindow screen and user interface with the idea and proposal items when the tool had been used about one week.

The IdeaWindow was placed in the coffee room of the personnel at the gynaecological ward, on top of the cupboard by the window. The site of the IdeaWindow can be seen in Figure 2. The screen was positioned so that it was facing the diners at the table. The coffee room was chosen as a location for the IdeaWindow because all the other places for work duties were full of other equipment and supplies and the personnel suggested this one for a place. The staff's coffee room seemed to be the place where they had gathered a lot of work-related notes and information papers, which was detected on the numerous documents on the info board (Figure 2). Therefore it was interpreted as a place where the personnel might have some time for thinking and reflecting their work from the development angle.



Fig. 2: The staff's coffee room where the IdeaWindow was located during the experiment. And the info board in the coffee room with some notes and documents on it.

3.2. Data collection and analysis

The research data consists of two kinds of material: first, of 43 idea or proposal items in the IdeaWindow written by the employees during seven week period in the gynecological responsibility area at Tampere University Hospital between April and June

2015, second, of 16 responses to the inquiry which was mailed to the personnel in July 2015 immediately after the IdeaWindow experiment.

The Idea Window data has been read through carefully and categorized under four different themes according to the subject they contain. Themes are placed in ascending order by number of items they contain. Thus, it was possible to survey, for what kind of perspectives and topics the employees used the IdeaWindow and what kind of issues were more common or rare in front-end of service development experiment where the jointly tackling issues were not limited to certain topics.

The IdeaWindow items were also categorised in three different types according to the choice user made on the screen when leaving an item in the IdeaWindow. In the current version of the IdeaWindow there are two types of items/inputs: ideas and proposals. Ideas are categorised as orange, green or red. A proposal can be marked either as a solution or an experiment related to the idea in the IdeaWindow. The idea is orange if the user thinks it is based on a negative finding, or green if it is based on some positive experience, and finally red if the idea is presented as open, as if it was a question. Ideas can exist independently in the IdeaWindow but the proposals are always attached and connected to minimum one idea or maximum five other proposals. In other words, the idea items are like the initial cells in which these proposals are associated with. In our study we also looked at in what kind of groups the ideas and proposals appeared and how the ideas and proposals formed the chains.

Our research data consists also of the inquiry data that was collected and analysed to get more information about profiles of the personnel participated to the study, and also the descriptions of the situations that were the reason behind of their ideas or proposals. In the inquiry, the respondents were also asked to tell how they would like to see their ideas or proposals been developed in their working environment, and how they themselves could contribute to the development.

At the end of the survey, respondents were evaluating how necessary and easy to use the IdeaWindow has been in their work context. These responses are also part of our data and analysed mainly for further development of the tool but also from the point of how the employees have generally responded to this type of artefact as part of the development of their own work.

In the analysis of the IdeaWindow data, we explored what kind of perspectives and topics the employees brought up when they used a prototype of the virtual co-creation tool in the front-end of service development. We were interested, what kind of situations and things the employees pay attention to so that they want to share them with others and what kind of ideas evoke employees to make their own suggestions for a solution or experiment. More generally, what awakens employees' initiative and entrepreneurial spirit? How do they represent their views and insights for improvements or change? How could the virtual co-development/co-creation tool assist and enable the spontaneous action of workers from starting their own initiatives? What are the features in the tool and what would be needed in addition to it for entrepreneurial behaviour and actions arising in healthcare workplaces?

We have also analysed how the personnel described the reasons to use the IdeaWindow. In analysis we have examined how they describe their motivation, anxiety or frustration behind the idea or proposal they have left in the tool, how the topic of their idea or proposal is in relation with their reasoning, and how they evaluate the Idea Window and its feasibility and ease of use.

4. Findings

The staff took the initiative already at the very beginning of the experiment. Although the IdeaWindow guidance session at the ward took only about half an hour few participants were listening really carefully and they themselves made an A4-sheet of instruction manual that was available on the coffee room table. Noteworthy in the instruction was how clearly and in inspiring way the writers were describing the intended purpose and use of the IdeaWindow. According to them, the IdeaWindow was primarily meant to be a tool for ideation and brainstorming together and to look at the everyday work from the client/patient point of view: *IdeaWindow has been developed for a tool through which employees can brainstorm and comment on the everyday activities from the customer and patient orientation. Situations may include encounters with clients/patients, remarks on the facilities and practices, or equipment and good related ideas or comments. The idea is to look at our environment and our practices from the perspective of the customer service experience. All written ideas are anonymous.* In their A4 guide, the nurses compared IdeaWindow as an interface to smartphones or tablet computers. In addition, they managed to tell step by step the main principles how to use the IdeaWindow in very compact way. The instruction note made by the nurses in in the Figure 3.

Hi kaikki,

In the coffee room, there appears the Idea Window display screen. The IdeaWindow is part of the service design project that has been implemented in gynecological responsibility area at Toys. IdeaWindow has been developed for a tool through which employees can brainstorm and comment on the everyday activities from the customer and patient orientation. Situations may include encounters with clients/patients, remarks on the facilities and practices, or equipment and good related ideas or comments. The idea is to look at our environment and our practices from the perspective of the customer service experience. All written ideas are anonymous.

The display screen is here six weeks. During the first three weeks we will focus on the hospital department side of things, and during the latter three weeks the issues coming up from the VTO side. Ideation can start immediately. Therefore everyone will feel free to experiment.

The display works by touching and reminds a lot of smartphone or tablet computer. In upper left corner there are three circles. Smiling circles can be used for positive ideas and considerations, sad one for negative ones, and question mark is for open ideas and comments. On the left side of the screen, there is place for active ideas and for describing the idea. The large circle on the right side of the screen is storage for the ideas. From the storage the idea can be dragged back to empty space on the left side of the screen and there the idea opens in bigger size.

Writing on idea requires a title. It is hoped that the titles would be short and concise preferably one word or two short words. Other people's ideas can be read, and it is possible to propose a solution or a trial related to them. Solutions are attached as cells around of the original idea, and they form together the idea clusters. If you try some practical solution, please create a separate idea from it and describe how it worked. The experiment cannot be linked directly to the idea cluster, at least not yet.

If you have any questions related to the IdeaWindow the undersigned and Riitta Ojala are happy to answer to them.

Now feel free to create ideas!

Regards,
Jaana S., Christina and Jaana K.

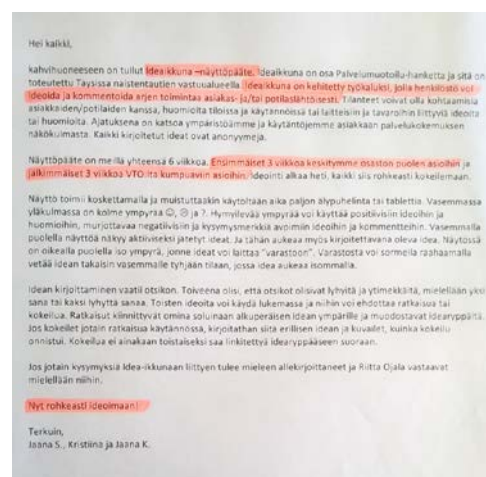


Fig. 3: Instruction for using the IdeaWindow made by three nurses on their own initiative after brief half-hour guidance the research team gave to the personnel in the beginning of the experiment.

During the seven week period 43 items (ideas or proposals) were recorded in IdeaWindow. We categorized all the 43 items in the IdeaWindow into four themes on the basis of the content of the items. The four theme categories are as following and presented in the Figure 4.

1. Technology and tools for work

Within the items in the category of Technology and tools for work, employees made remarks related to renewal and acquisition of the equipment and tools they would need in their work. This category was the largest item group in the IdeaWindow data with 17 items:

- **11 of the 17** items were ideas for renewing or acquiring new tools and material, like acquiring more devices often needed at work. More than half of them appeared in the IdeaWindow as single items that were not attached to any proposals for a solution or experiment.

“There are not so many proper machines that would be used for reliable KTG [CTG, cardiotocography] which would show fetal heart beat and movements, and also contractions, mother’s heart rate and RR-measurement. We have to search for the machines from different rooms and wait in a queue to get the proper machine.” (CTG machines)

- **4 of the 17** items were proposals for a solution related to the ideas. These proposals were like points on the checklists.

“To get Avalon-machines, so that every room would have one KTG [CTG]. In this way the machines would be easier to manage for washing, for adding accessories, and there could be always machines available. They would stay in better condition with less moving from place to place.” (In every room)

- **2 of the 17** items included proposals for an experiment. In these items, the employees were listing down their needs for new tools as proposals for an experiment.

“Our own TV too!” (TV)

2. Reorganising places and equipment

The items in the category of Re-organising places and equipment contained the ideas and suggestions of employees for re-organizing and re-setting the equipment and space of work. This category was the second largest with 14 items:

- **8 of the 14** items were about the ideas for reorganising places and equipment used at work. Typically, these ideas regarded changing the placement of furniture and technology in working area. 7 of the 8 items in this category appeared in the IdeaWindow as single items which were not attached to any proposals.

“There is no air condition in the rooms. The rooms are hot and stuffy.” (Hot, bad air)

- **2 of the 14** items were proposals for a solution, for example the proposals regarding issues like how the goods and materials could be more easily available in new locations.

“Because there aren’t Avalon machines available for every room, bring the machine into a hallway after KTG [CTG] ends so there is no need to seek and disturb the patients.” (Avalons)

- **4 of the 14** items included proposals for an experiment. These proposals included typically some reasons and explanations why it would be good to do the experi-

ment. Or the employees suggested several different concrete solutions for the problem.

“We could place another table at the window? Why it is not possible to have meal in the day hall?” (Tables)

“Would it be possible to put some more shelves in the wardrobe and in there would be some chronics, cleansers, etc. for cleaning the CTG-machines, etc? Or maybe a separate cart?” (Storage room)

3. Organising work

The items in the category Organising work contained the ideas and suggestions of employees for reorganising work routines and practices. This category included 6 items all together.

- **4 of the 6** items were single ideas for reorganising work routines and practices.

“The doctor round in tutkari [research room] works pretty well.” (Doctor round)

“On the department side also, it would be nice if the morning shift would not disappear to coffee room, but would help the shift through.” (Morning shift)

- **1 of the 6** items brought up proposal for a solution related to the work organising issues.

“In the report reading time there is no one else than readers in the office. The earlier shift could have their coffee pause at the same time.” (Proposal)

- **1 of the 6** items brought up proposal for an experiment related to the work organising issues.

“The nurse of the room could give a short report for the nurse in charge, who would plan the working pairs when the overall situation in the department is clear.” (Nurse in charge)

4. Customer service situations

Customer service situations items were as large item group as the items in the category of Organising work. Thus it contained 6 items all together.

- **4 of the 6** items were single ideas related to customer experiences and customer service situations. According to the data login of the IdeaWindow all the items within this category were recorded during the last days in the experiment period.

“A patient came up with the idea that people from canteen could go around the departments and sell magazines, etc. for those who cannot go there by themselves.” (Canteen)

“On the department side also, it would be nice if the morning shift would not disappear to coffee room, but would help the shift through.” (Morning shift)

- **2 of the 6** items in the Customer service situations category included proposal for a solution for improving customer service.

“In the report reading time there is no one else than readers in the office. The earlier shift could have their coffee pause at the same time.” (Proposal)

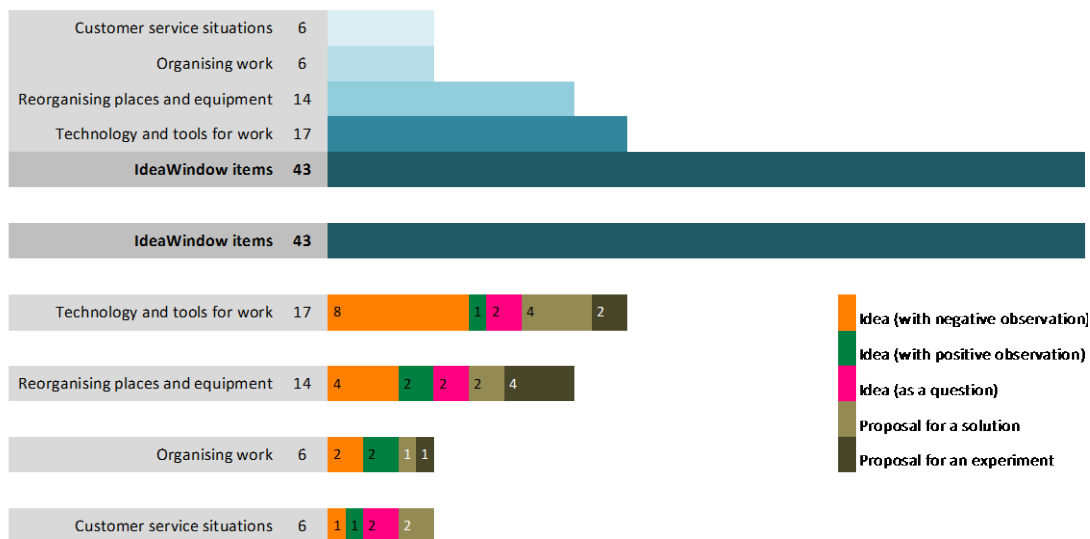


Fig. 4: The items in the IdeaWindow grouped into four themes according to content. The items have been coloured based on the type they appeared on the IdeaWindow user interface.

The themes of the IdeaWindow items were quite similar to the topics that emerged when the IdeaWindow was co-created with the personnel in the previous research project in 2014. Topics such as technology and tools or reorganising work practices were common also then. At that time, the findings showed that the IdeaWindow as enabling open communication, meaningful development, and grass-root level development (Lahtinen et. al, 2014). In both research projects, the IdeaWindow turned out to be helpful in acquiring and sharing knowledge and experiences on new opportunities and ideas more comprehensively than in ad-hoc face-to-face situations in the work community. It can serve as a good starting point for employee-driven development.

Several practical and concrete ideas and proposals in the IdeaWindow showed that employees are interested in each other's thoughts and ideas for improving and developing work life, although the purpose of the ideation wasn't precisely defined and clear in our experiment. However, the staff in the hospital had a need and will to tackle the challenges they face in everyday work. The IdeaWindow was taken into use without bigger resistance or questioning. It seemed to provide the employees a checklist kind of communication tool for their problems and challenges at work, for example for their problems in cooperation or troubles in customer service. It collected and stored the data that mattered to them. The virtual co-creation tool can assist in assembling experiences and thoughts of employees and even other stakeholders, like customers, for a starting point and background for co-creation. But progress from everyday observations and experiences into co-created solutions, reforms, renewed practices and innovations will need some guidance and structure and also trust and transparency from the process and the organisation on a larger scale. The following citations regarding the necessity of the IdeaWindow pave the way for how the tool should be developed in future, but they also underline what should be taken into account when engaging employees in innovation and development.

"To bring up the issues anonymously. For ideas of the personnel for problem solving...Usually the best and easiest way to make developmental change."

"[For subscribing] Deficiencies, in order to remember and wouldn't disappear them among the general complaints."

"If the ideas were implemented the [Idea]window would be more useful. Or if we were at least discussing about the ideas, and the old functions could be called into question, and we weren't only saying that is matter of missing money or that we've always done these issues like that..."

"Maybe the placement [of the IdeaWindow] made it complicated to use. There aren't so many who want to talk about the work issues in the coffee room but instead want to have a very deserved break. Many of the best ideas come up in patient rooms, by the work, and those ideas will not be written down in the coffee room. Ideas will either not been forwarded or they will be presented directly to the supervisors. In a different unit the IdeaWindow could work, but in the intensive care unit the use of it should be reflected more."

Some of the suggestions did not fall in these four categories explained above or suggestions included some words or phrases that led us to conclude that the respondent sees the IdeaWindow to offer an opportunity to express feelings and attitudes of the relationships or overall working climate of the ward. In some cases these kinds of suggestions were easier to interpret but in some cases it stays quite unclear what is the respondent's actual idea or proposed solution. In the first example the respondent's idea and solution is constructed rationally:

"The new and fast thermometers would help the work and save the nerves of the patients and nurses."

The respondent suggested that the department would get the new thermometers to speed up the examination. The respondent seems quite confident that this would also make the job easier not only to the nurses but patients too. In the second example the respondents idea and solution is more challenging to interpret:

"On the department side also, it would be nice if the morning shift would not disappear in to a coffee room, but help the shift through."

The respondent feels important that everybody contributes to the work to get it done. The respondent wishes that the morning shift would help the shift to the end and not leave their duties and go to their coffee break. However it stays unclear why this happens or does it happen all the time and does this concern everybody who works at the morning shift. It is clear that it is reasonable to ask everybody contribute to the work but in this example it stays challenging to recognize the actual solution that would help the whole work community.

Third example draws closer to the second example but it shows some directions where the situation could start to unravel:

"Especially in the afternoon, at the time of silent report, there is lot of noise and disorder in the office. You can't read the report at your peace and you lose your concentration. For the time of silent report the office should be quiet and if the earlier shift has something to report, they could do it just before the shift ends."

The respondent describes the problematic situation where it is hard to concentrate on reading the report. The respondent suggests some new arrangements on the offices

schedule and some new reporting practices for shifts. Although, it would take some time to bring up these suggestions, there is still something one can work with.

In the further use of IdeaWindow, it would be important to find ways to recognize more carefully and categorise these kinds of inputs explained here. These small fragments could easily be ignored as an angry feedback given by employees but we see this as an opportunity for workplace developers to learn more about how employees see the situations and tasks in their own work.

According to the user ratings in the inquiry, the IdeaWindow was considered Quite necessary in the hospital and Easy to use. The Figure 5 presents the user reviews in the table. 9 of the 16 respondents evaluated the IdeaWindow quite necessary, 4 of the 16 respondents found it very necessary, and 3 of the 16 respondents either didn't experience it necessary at all, or couldn't say. 8 of the respondents experienced the IdeaWindow easy to use, 4 of 16 felt it very easy to use, one respondent felt it very difficult to use, and one couldn't say. These results encourage developing IdeaWindow as a low threshold co-creation tool and perhaps particularly as a platform for capturing and sharing knowledge in multidisciplinary collaboration and networks. In the research we tested it as a co-creation tool in front-end of service development but in future the development and testing could be extended also to other phases of innovation. It would be interesting to see how IdeaWindow would work in impact monitoring or in longer-term co-creation.

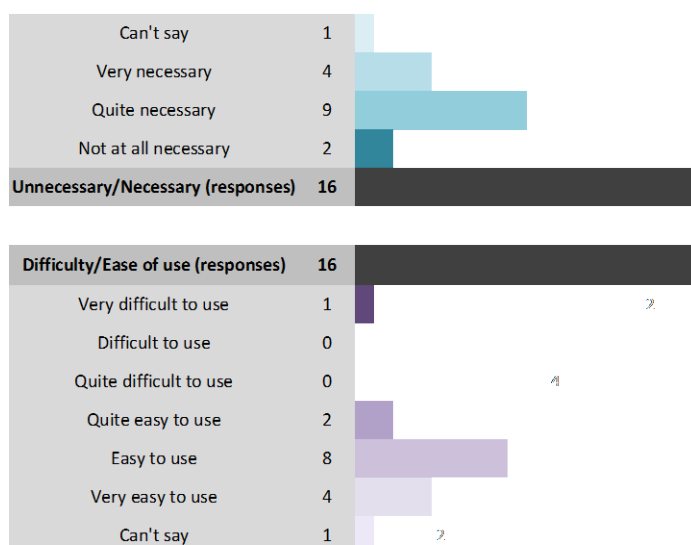


Fig. 5: User evaluations (Unnecessary/Necessary and Difficulty/Ease of use) on the IdeaWindow. Evaluations from the inquiry responses

The IdeaWindow items were also grouped according to how they appeared on the IdeaWindow user interface. In the Figure 5 all items have been placed into groups according to their appearance either as single ideas or as part of the idea/proposal groupings.

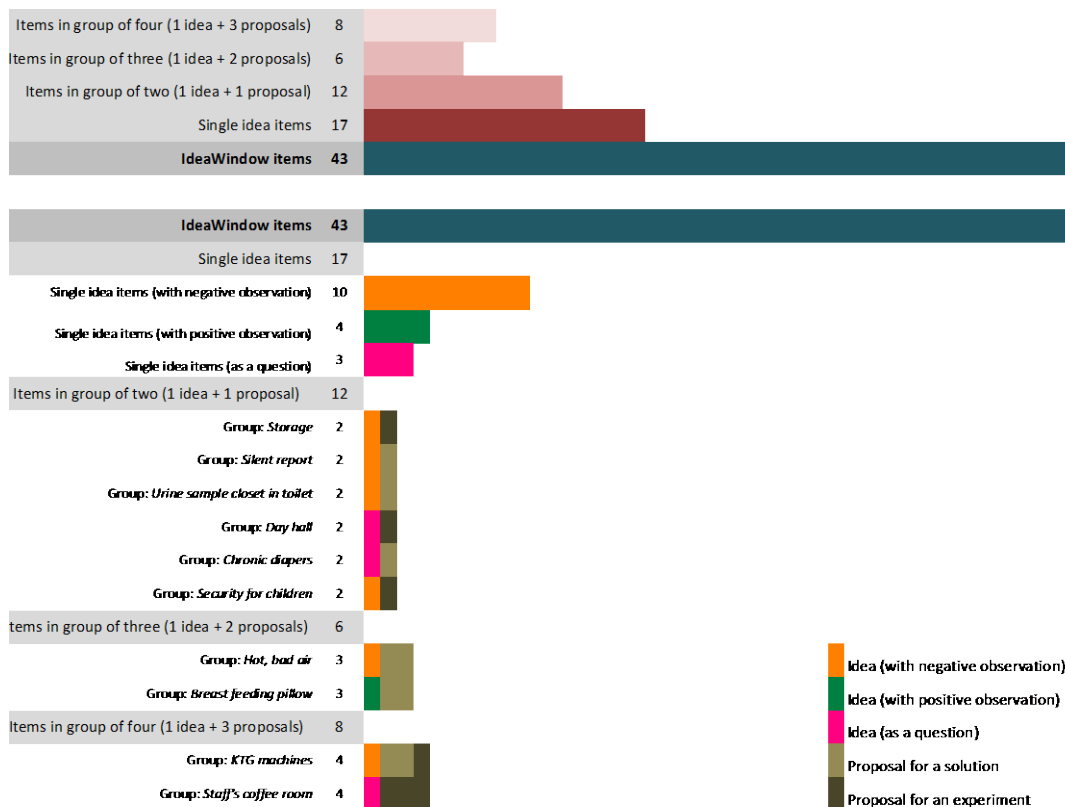


Fig. 6: Ideas and proposals of the employees calculated and grouped according to their appearance on the IdeaWindow screen.

26 of the 43 items in the IdeaWindow appeared in groups. And 17 of the 43 were single ideas. The amount of the groups shows that the virtual co-creation tool enabled employees to bring out their quiet, hidden ideas, and to create thinking paths starting from initiative ideas and continuing as far as proposals for solving problems or proposals for some kind practical test or trial to figure out what could finally work as a solution.

Assumption of the research group was that the single idea would be the most common type of the items in the IdeaWindow. Therefore the result was a little surprise. Surely, the IdeaWindow as an interface directs the users to add new items to the existing ideas on the screen. The dialog in the items provides the user with three options to continue when reading the descriptions of the ideas: 1) user can add a new proposal for a solution to the idea, or 2) user can add a proposal for an experiment related to the idea, or 3) shut the dialogue box and enter a new idea item. However, our result may also indicate that reading the ideas of the colleagues in this visualized form may lure user to take the thinking process forward. The experiment produced surprisingly large number of item groups, even if the process itself was blurred and experimental. This inspires to examine more the thinking paths and chains in the front-end innovation and testing and developing methods which might foster collaboration and co-creation at work.

5. Discussion

The aim of this paper was to increase the understanding of the ways the virtual tool is used in fuzzy front-end of open and unstructured innovation process and what kind of initiatives are raised up and which proceed into brainstorming phase. The ideas raised up in IdeaWindow could be categorized into four groups. Most ideas were about technology and tools for work. Almost as many ideas and proposals concerned reorganizing of places and equipment. Organising work and developing customer service situations were suggested more rarely. The two first mentioned categories got also most of the proposals. There were altogether 27 ideas and 16 proposals. Hence, many ideas in IdeaWindow gathered proposals from co-workers developing a path of discussion. This is a good example of knowledge sharing and learning in organisation, which both are important elements of innovative environments (Martins and Terblanche, 2003).

Behind the ideas or proposals left in IdeaWindow can be found concerns about the patient safety and well-being, frustration about the time spend in searching for proper equipment and other things needed in nursing, as well as wishes to serve the patients better. Also items that are linked to technology and tools for work or reorganising places and equipment are mainly linked to needs of the patient or improving care. This raises the question should staff members and patients use the IdeaWindow together, and thus complement each other's views and knowledge. The combination of expert knowledge and patient experiences could offer an opportunity for developing new work practises, but also for maintaining good customer service and renewing working culture incrementally more customer-centered.

Those who commented the items in the IdeaWindow were all nurses, except one, although the tool was available for every worker including also physicians and supportive staff in the ward. Because of the relatively low amount of inquiry responses we can not trace how widely the other professions than nurses were using the IdeaWindow. This calls for future discussions and reflection in our research group. Is it important to know how many staff members are using the IdeaWindow? Are the ideas and proposals results of an active but small group of people or is the IdeaWindow regarded as a common arena for all to participate? And what kinds of processes are needed for widening the use of IdeaWindow in front-end of innovation and maybe also in other phases of innovation?

This paper is based on the preliminary findings of the study in progress. Already these findings open up exciting new research opportunities. The preliminary findings indicate that IdeaWindow serves as a good starting point for employee-driven development, but it is not sufficient. As such it does not support corporate entrepreneurship or effectuation. However, many of the ideas that were entered in the IdeaWindow started quite modestly from the resources available, which is in line with effectuation. The flip side of this modesty of the ideas was that there were no totally new, groundbreaking ideas, which would expand the creativity beyond everyday thinking. The self-made instruction sheet by the IdeaWindow can be interpreted as a signal of entrepreneurial attitude. This should be cherished and promoted in case more employee-driven activities are expected from the staff.

Most of the entries in the IdeaWindow were made by the nurses, therefore there were just a few cross-domain learning between professions. In order to better under-

stand how - and if - the work environment in health care or in other domains could generate and foster collective creativity and co-creation, we need more information and studies related to leadership styles, roles of different professions and hierarchical systems and their connections to the employee-driven innovation and corporate entrepreneurship. For that purpose some of the members of the hospital ward will be interviewed later this year and the resulting data will be connected to data and findings of this study.

Results presented here encourage developing IdeaWindow as a low threshold co-creation tool and perhaps particularly as a platform for capturing and sharing knowledge in multidisciplinary collaboration and networks. In the current action research we tested it as a co-creation tool in front-end of service development but in future the development and testing could be extended also to other phases of innovation. It would be interesting to see how the IdeaWindow would work for example in impact monitoring or in longer-term co-creation process. Action-research based studies also in other domains than in health care have been considered in this sense.

When comparing the preliminary findings to the results of the previous research project, some similarities can be found. Based on the results of both projects, health care professionals are willing to create meaningful and practical frames for co-creation at work, and they will participate to the process actively, if it fits to their context. But the employees also show quite clearly that they need to be encouraged and provided with easy-to-use methods and tools, and they wish to be involved in collective processes and decision making that support co-creation at work. Within this palette of means, the virtual insights collecting and sharing co-creation tool could be a kick-start, fuel and side eye on the way.

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New approaches to patients' services and new uses of ICT (Information and Communication Technology) in Co-operative Interface Organizations as a lever to improve the French Healthcare System

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As in most developed countries, the French Healthcare System tackles an important crisis with the central question of costs, linked with the key issues of efficiency and performance. Solutions are sought in new uses of information tools and communication actions to promote the involvement of patients and their responsibility. New Interface Organizations developed in the last years between primary care and hospital's sector may have an interesting role, especially to better integrate patients in a co-production of services perspective focusing on considering their emotions and feelings to improve their involvement. We will analyze the case of GPS Diapason in Ile-de-France Region. We also discuss new ways for coordination's innovation in a healthcare local perspective in a sustainable and solidary view.

Comme dans la plupart des pays développés, le système de santé français est confronté à une crise importante avec la question centrale des coûts, avec celles de l'efficience et de la performance. Des solutions ont été recherchées dans de nouveaux outils d'information et dans des actions de communication pour favoriser l'implication des patients et leur responsabilisation. De nouvelles organisations d'interface développées ces dernières années entre le secteur de la médecine de ville et celui de l'hospitalisation peuvent jouer un rôle intéressant, spécialement pour mieux intégrer les patients dans une perspective de coproduction de services en prenant mieux en compte leurs émotions et sentiments pour améliorer leur implication. Nous analyserons le cas du GPS Diapason en région Ile-de-France. Nous discuterons aussi de nouvelles approches innovantes de la coordination dans une perspective locale de solidarité et de développement durable.



1. Introduction

The French Healthcare System tackles important contradictions. Considered some years ago as the best in the world by World Health Organization – WHO (2000) especially in term of access to its services for all the citizens, it is also in crisis and may be considered as “out of breath” (Isaac) and must evolve. One can consider that it is effective (good results in terms of care) but expensive (issue of the huge deficits of the Welfare budget) and therefore not efficient: its costs are the highest of all European countries (12% of GDP), only surpassed in the developed countries by the United States (17 %).

The Isaac’s report (2014) proposes a “paradigm shift”: changing from an almost only curative to a much preventive approach, relying on ICT (Information and Communication Technologies). The French Healthcare System is also characterized by numerous divisions or walls, synonymous with poor quality, particularly between the primary care and the hospital sector with the full weight of the hospital sector (“hospital-centrism”).

This is the challenge of improving cooperation and coordination especially through new Interface Organizations (Bloch-Hénaut, Bourret).

Without mentioning particularly the specific texts for the hospital’s sector, many reforms have followed over the past fifteen years with three main Laws. Let's start with the law of March 2002 on “The rights of patients and the quality of the Health System”¹ which particularly promoted the concept of “health democracy” (*démocratie sanitaire*) and valued the Healthcare Networks. The law of July 2009 about “Hospital, Patients, Health, Territories”² increased regionalization of health management by transforming the Regional Hospitalization Agencies (ARH) in Regional Health Agencies (ARS) ³with a view to “*déconcentration*” (managed by the State level and not by Regions), causing quite paradoxical debates: is it a real regionalization of health management or a new way to strengthen the role of the State at this new level? A new law of "Modernization of the Health System" was passed in April 2015. The press document of the Ministry of Social Affairs and Health speaks of nothing less than to "change the daily lives of French" with “strong concrete measures to develop prevention, improving access to care, and create new rights for patients” ⁴.

All these changes are largely based on the use of ICT devices meeting the “augmented human” and the “quantified self” issues and the widespread use of data (Open and Big Data with the issue of patients' rights). We will study the approach by co-production services at two levels: between professionals and also by involving patients and their families.

¹ In French, *Loi relative aux Droits des Malades et à la Qualité du système de santé – 4 mars 2002*.

² In French, *Hôpital, Patients, Santé, Territoires*.

³ In French, ARH : *Agences Régionales de l'Hospitalisation* – ARS : *Agences Régionales de Santé*.

⁴ <http://www.loi-sante.gouv.fr>



After this introduction, we present our methodology and positioning of researchers. We will address the major challenges of the French Healthcare System, which, for us, are mainly challenges of efficiency and coordination - cooperation arising primarily in terms of information and communication challenges and integrating patients' involvement. Then we will study the specific role of interface organizations as shift lever of improvement of the French Healthcare System notably through the case of GCS ⁵ Diapason. We finish by a prospective conclusion.

2. Methodology and Researchers' Positioning

In a constructivist approach of managing complexity (Morin, Le Moigne), we position in the Information and Communication Sciences field, considered by F. Bernard at the convergence of four different issues: that of link (relationships, interactions), that of meaning and that of knowledge for action.

We also position in the approaches of complexity (global and systemic) in the Morin's and Le Moigne's views and in Action Research perspectives: to produce usable knowledge for actions, validated by all the stakeholders, with co-production of knowledge (Meyer) and so in some part of co-production of services between all the actors (including patients and their families) especially through communication actions and shared information.

We begin using the "situational and interactionist semiotic approach" (Mucchielli, 2010) and the notion of "intelligence of situation" (Autissier, 2009). We propose to integrate the experiences of actors including the emotions and feelings of patients, to promote their better involvement, relying in particular with the works of F. Martin Juchat, Bègue-Desrichard, C. Maman or A. Soares integrating these perspectives in a dynamic approach, considering the patient's pathway as a process (in a quality management perspective).

Our work is based on co-operations established in France (particularly around students' works in Masters: observation, participation in meetings, interviews with key actors in different organizations) so with the GCS Diapason in Ile-de-France Region or other French Interface Organizations but also with comparisons with another health interface's organizations in foreign countries as in Spain (Basque Country).

We position in two different and complementary ways: in a rather observatory approach (C. Bourret) and in an involved researcher approach, working in responsibility functions in these interfaces' organizations (thesis of C. Nkondjock).

⁵ In French, *Groupeement de Coopération Sanitaire*.



3. Mostly efficiency, coordination and cooperation challenges

As we have developed before (Bourret, 2010), one of the main challenges facing the French Healthcare System is that of the divisions (in French : *cloisonnements*) formulated primarily by M.-A. Bloch and L. Hénaut (2014) as a challenge of coordination, clarity and coherence of actions and in other countries as “walls” (Glouberman – Mintzberg, 2001).

Referring to H. Mintzberg (1982), they point out that all human activity corresponds to two basic needs: the division of labor between the tasks and the coordination of these tasks, these two aspects can become contradictory. The need for consistency is essential for the number of different jobs existing (more than 180 in just the Healthcare sector).

For them, "Coordination is therefore both a problem and a solution" (2014, 13). It has two aspects: horizontal (between sectors) and vertically (between institutional intervention levels).

Coordination became one of the main axes of the action of the State with the NPM (New Public Management), became in 2012 MAP (Modernization of Public Action). According to E. Minvielle, in the Healthcare sector, it is the creation of ARH (Regional Hospitalisation Agencies) that embodied the "new public management in the French fashion." They became ARS (Regional Health Agencies) in 2010 as part of HPST Law and are at the heart of the new Public Health Law of spring 2015.

Therefore, coordination in recent years has become an obsession of public powers. Faced with this "order to coordinate", medical and medico-social professions evolved, including the emergence of new professions around coordination (case managers, Health Network coordinators or coordinators of MAIA - Houses for Autonomy and Integration of Alzheimer Patients⁶...).

For us the challenge of coordination / cooperation can be tackled at two levels of complementary approaches:

- Information and communication challenges,
- to promote new approaches to innovation for developing co-production of services between all the professions and with patients and their families. Since 2004, France bet on DMP⁷ or patient's personal medical record to ensure both traceability of actions and spending efficiency by avoiding duplication of medical acts.

The management of the DMP project was a resounding failure, almost turning to State's scandal. The DMP revived in 2010 from "personal" medical record belonging to the patient to "shared" medical record. This repositioning of the DMP is one of the

⁶ In French, MAIA : *Maisons pour l'Autonomie et l'Intégration des Malades d'Alzheimer*.

⁷ In French, DMP : *Dossier Médical Personnel*.



key measures of Public Health law passed in spring 2015, "so that at every stage of care, professionals and patients have access to all medical information." This "new" DMP should be the main support for the control of care pathways, new formulation of the concept of coordination that gradually asserted in public speeches in last years. The last formulation of coordination is the notion of PPS⁸: personalized plan of care. This evolution of DMP as tool of PPS with development of other ICT tools take place in the whole context of the "augmented human" and of "quantified self", with the specific role of the CNIL ⁹.

These evolutions meet the notion of digital care territories or in French TSN : Territoires de Soins Numériques. Proposed as part of the Future Investments ¹⁰, the program "Digital Patient Territory" wants to modernize the Healthcare System by experimenting in some pilot areas, services and the most innovative technologies for e-Health.

Of the 18 projects supported by the Regional Health Agencies (ARS), 5 were selected for their innovative and sustainable character, their adaptation to local realities, their ability to mobilize a majority of stakeholders and their expected impact on value chain development with industrial e-Health: in Aquitaine: XL ENS (Health Digital Space in Landes Department) ; in Burgundy Region: E_TICSS (Innovative Territory coordinated social health); in Ile-de-France: TerriS@nté ("Digital as Health service in the Great Paris area"); in Rhône-Alpes region: Pascaline (Health Pathway and coordinated access to digital innovation); for the Indian Ocean French territories: PLEXUS OI (exchange platform for new uses of health ICT).

These projects directly affect 1.4 million people, both urban and rural, and respond directly to the challenges identified in the Health National Strategy and the new law on the modernization of the Health System (2015): innovative organization tracks centered on the user and to reinforce the pathway's approach ; better coordination between health professionals, patients and caregivers, with significant mobilization of support services ; support of technological innovations developed through the cooperation of many actors, industrialists, actors in the provision of care, local powers and institutional partners.

Of course these projects within the field of e-health are supported by other projects such as telemedicine projects.

At the end of the program, the solutions that have proven efficiency will be generalized. This view marks an evolution of the experimental approach developed from over 20 years to limit often questionable and difficult to generalize experimentations (Cordier et al., p. 14, quoted by A.-M. Bloch and L. Hénaut).

⁸ In French, PPS : *Plan Personnalisé de Soins*.

⁹ CNIL : *Commission Nationale Informatique et Libertés*.

¹⁰ In French, *Investissements d'Avenir*.



4. Healthcare Interface organizations as a change lever?

Healthcare Interface Organizations may be considered as spaces for innovation, experimentation and development of trust (Bourret, 2010), both for the human actors (individuals or belonging to organizations) and also in digital tools (digital trust), also with the recognition of different roles: that of doctors, nurses, social workers, patients and their families, etc.

Healthcare Networks appeared in the 1980s, especially with the AIDS epidemic and the need for coordination between general practitioners (primary care) and hospital sector and between the medical and the social sector. Their role has been enshrined in the Law of March 2002 already quoted. They also developed for different diseases (diabetes, cardiology, etc.) or for specific situations (perinatal care, addictions, obesity, geriatrics, oncology, etc.) ¹¹. In different situations their role would be better defined with HAD (Hospitalization at Home)¹² organizations which have developed to maintain patients at home and constitute specific and recognized organizations ¹³.

First Healthcare Networks constitute coordination structures of professional activities engaged in different places, often with just a phone center to receive patients' calls and to guide them. We have particularly work with the Healthcare Network Bronchiolitis in Paris, Gérontopastel Network for elderly people in Toulouse, or Arcade Network for Palliative care in Tarbes – Hautes Pyrénées Department.

The rivals of the Healthcare Network, Pluriprofessions Medical Homes ¹⁴ include different practitioners on the same site, as it is, for example in Spain for *ambulatorios*.

We must also speak about CLIC ¹⁵, specific coordination structures but without cure or care aspects, favoring coordination and orientation aspects, particularly for elderly people.

In the recent years, the public authorities seem to prefer them and encourage their development, focusing also on grouping and coordinating activities. Thus the Healthcare Network on Diabetes in Eastern Ile-de-France (Revesdiab) became the main actor in the new structure of GCS (Health Cooperation Group) Diapason (in southern Seine-et-Marne department, which represents half of the area of the Ile-de-France Region).

¹¹ <http://www.sante.gouv.fr/les-reseaux-de-sante.html>

¹² In French, *Hospitalisation à Domicile* (HAD).

¹³ <http://www.sante.gouv.fr/l-hospitalisation-a-domicile-had,12379.html>

¹⁴ In French, *maisons de santé pluriprofessions*.

<http://www.sante.gouv.fr/les-maisons-de-sante.html>

¹⁵ In French, CLIC : *Centres Locaux d'Information et de Coordination*. <http://clic-info.personnes-agees.gouv.fr/clic/construirePageLogin.do>



Other modalities of cooperation have also emerged in recent years as the PAERPA experiments (Elderly at risk of loss of autonomy ¹⁶) that particularly highlight PPS (Personalized Care Plans) which focus on monitoring of individually sustain or patients' or care pathway, set up by the Healthcare networks, applying in this case to in elderly patients. So GPS Diapason applies a PPS to diabetic patients. MAIA (Houses for Autonomy and Integration of Alzheimer Patients) were mainly intended to be a main entrance in the Healthcare system for patients with this disease and their families. They were put in place by the new CNSA (National Solidarity Fund for Autonomy ¹⁷). They have often considered the arrival of PAERPA as unfair and unnecessary competition.

These interface organizations are an attempt to answer the central problem of the divisions or walls of the French Healthcare System. But their proliferation, often without no real consistency or overall vision, according only to local initiatives of different Health Insurance or Social Security funds or territory collectivities (departments, municipalities, etc.), can ask questions because it can lead to new divisions and perhaps a loss of efficiency ... as outlined by a recent report (Cordier and al., 2013).

Many researchers also emphasized the unreadable aspect of the offer of care services on the territories. This is particularly the case for helping the elderly people with loss of autonomy which the roles and missions of the respective activities overlapping territories are often far from clear between Healthcare Networks, CLIC, HAD, and, more recently, the MAIA and PAERPA.

5. To a new patient's approach integrating their emotions and encouraging their involvement

The role and the responsibility of patients progressively developed, particularly in anglo-saxons countries with the notion of "empowerment".

In France, the role of patients developed particularly with the AIDS epidemic and received a first and important consideration in the March 2002 Law with the notion of "health democracy" ¹⁸ with the key role of associations such as the CISS (Interassociative Collective on Health ¹⁹) and with the "judicialization" of healthcare from the perspective of "perfect health" described by L. Sfez: obligation of results and not just of means. In the hospital sector, we must outline as application of the 2002's Law the hospitalized patient's charter of 2006.

¹⁶ In French, PAERPA : *Personnes Agées en Risque de Perte d'Autonomie*.

<http://www.sante.gouv.fr/le-parcours-sante-des-aines-paerpa.html>

¹⁷ In French, CNSA : *Caisse Nationale de Solidarité pour l'Autonomie*.

¹⁸ In French, *démocratie sanitaire*.

¹⁹ In French , CISS : *Collectif Interassociatif Sur la Santé*.



As an extension of the Companion - Ghali report (2014), we also insist on the need to promote the role of patients, leading to a true co-production of services through a new local citizenship (new stage of development of "health democracy" (*démocratie sanitaire*) valued in the law of March 2002. This special point is one of the three strong action to "create new rights for patients" in the 2015 Law.

Another aspect deserves special attention: that of the family and relatives who help the patient, who often act as lead coordinator and often threaten their own health, besides the cost of care (lower costs for the Healthcare system but stronger for the patients and their families).

A. Mucchielli (2010) proposed a method to access to meanings and to understand what things mean for an actor: the "situational and interactionist semiotics." Its key concept is the contextualization with linking the conduct or phenomenon with a background for highlighting, to qualify and assess the conduct and the phenomenon. This background is built by actor interpretation. The background for the interpretation defines a situation, split into different frameworks: the intentions and issues of the actors, their cultural background, their positioning in relation to other actors, the quality of relations, historical and temporal framework, a sensory setting. All the meanings build a "global sense" of the phenomenon that is the synthesis of meanings taken in different settings and for the different actors.

D. Autissier (2009) proposed a definition of "situation's intelligence": "the ability of individuals to understand the context and the way people act knowingly, so that any exchange is profitable and produce success". He proposes working from five key concepts: introspection, understanding, interaction, execution and capitalization.

From these two approaches, we propose broader perspectives extended to emotions and feelings of actors (Damasio, Goleman, Martin-Juchat), especially for patients and their families and a dynamic approach to change (process approach / quality management), the patient's pathway can be regarded as a process.

With the whole perspective announced in a recruiting poster for paramedical professions of the Department of Health (2006): "There are people who know that being at your disposal, it is also to hear what you do not say".

We propose to insist on the concept of emotional skills of patients, central element of emotional intelligence. The body is both the mediator from which the individual can sensitize its affects and communication to support them (Martin-Juchat).

Our hypothesis-goal is that to manage the emotions can become a collective objective of improving the quality of care. Social sharing of emotions is essential to promote the group membership (Bègue-Desrichard, 2013). This integration of emotions and feelings in the patient's personalized care can improve the quality of care, for example through better patient adherence to prescription compliance and taking drugs. The notion of recognition is also essential in the discussion groups. We will analyze the role of "mediator patients" already developed in some Healthcare Networks. Thus we place in the perspective outlined by the High Authority of Health²⁰ (2007) in its recommendations for patient's education, asking to recognize how to

²⁰ In French, HAS : *Haute Autorité de Santé*.



act in the patient's positioning to analyze his psychological evolution by developing techniques of patient-centered communication (active listening, empathy, encouragement, etc.).

The digital dimension is also essential. The areas of activities of different Interface Organizations can be considered as Digital Care Territories (TSN) in the same way as around individual patient.

The prospects outlined represent a new approach of services co-production integrating emotions and feelings of actors (Maman, 2014) applied in this case to the Healthcare sector. She particularly refers to the work of A. Soares (2003). Soares outlines the interest for the analysis of emotions at work and in organizations in two different perspectives. The first focuses on the emotions generated by the work. The second perspective, focused on the analysis of "emotional labor" and so to the expression of emotions at work service. It is still rather embryonic especially in France. It is this aspect that he wants to especially analyze. The challenge is for him to incorporate into researches, emotions and social relations that shape each other and tackle synergistically analyzes on work aspects and organizations. It will also provide a closer analysis of the complexity of everyday life in organizations.

More generally, this crossing from the individual dimension to the collective dimension is a major challenge to found a new citizenship, particularly in the case of Digital Care Territories (TSN) or also in Health projects as part of Smart Cities project, as outlined by M. Zacklad (2009, 2015).

So with the central concern of the authorities to organize better coordination of activities and cooperation in Healthcare on a territory. In this perspective, we propose to analyze the case of GPS Diapason.

6. The case of GCS Diapason

The GPS Diapason allows us to analyze a concrete way a health innovation on a specific territory, focusing in particular on the notion of PPS for complex patients with chronic diseases. Its main mission is the animation of a part of territory in Ile-de-France region around innovative practices involving the patient, especially diabetic, around the telemedicine project "Diabetes 2.0" (including the Healthcare Network Revesdiab). Diabetes 2.0 is a multi-year large-scale innovative project regarding both the city and the hospital. It provides various tools of tele-consultation, remote monitoring, tele-expertise, as well as virtual tools of therapeutic education. 2.0 Diabetes wants to use telemedicine as a training tool for health professionals and to promote patients' compliance. The ultimate goal is to improve the management of chronic diseases (diabetes here) and complications associated, optimizing care pathways and controlling health expenditures.

Initiated by GCS Diapason, this is an ambitious project that puts numerous economic interests in play. Diabetes 2.0 is the result of a collaboration that began with a call to the ARS project, "Telemedicine and Chronic Diseases". The response to this call for projects brought together complementary skills and visions around the common goal of improving the health status of diabetic patients. Each element of the project was designed to bring together all the necessary factors for patient involvement in their



care, to make available to them a comprehensive evaluation framework and to shed light on future structural arbitrations.

The medico-economic objectives are aimed at compliance with management protocols, in order to specifically prevent diabetes-related complications, improve the independence and quality of life of patients, develop patient skills, reduce avoidable hospitalizations and finally to reduce the costs of care.

The project manages three representative cohorts. A first cohort of newly diagnosed diabetic patients without known diabetes complications. A second cohort of already known and treated patients; diabetics aged 65 and older with glycated hemoglobin greater than 7% and/or having at least one known diabetes complication. And finally, a third cohort of patients ages 65 years and older with loss of autonomy at home or in nursing homes, in diabetes care with risk of hypoglycemia (insulin, sulfonylureas or glinides).

The ARS Ile-de-France, did not finally accept Diabetes 2.0, but remarked the quality of the file. The project was considered as too expensive and it has been criticized for lacking a viable business model in the long term (cf. Cordier's report new position about experiments, 2013). This is the difficulty of promoting a telemedicine project in the long run. However, ARS agrees to work with the GCS Diapason because the project will be more successful financially speaking.

One of the non-medical partners of the project is interested in the establishment of telemedicine with a strong presence for accessibility in Seine-et-Marne Department (77). It has a collaborative vision, in a time of crisis, with resources someone could call, "human". Pressing the territorial coordination seems paramount. How can the health system be changed with the ICT in times of crisis? Most likely with the help and responsibility of the citizen patient.

Collaborative work, with prospective and even visionary solutions, shakes preconceived ideas. The idea behind the project is to leverage the connection points to reach the territories still isolated today. For example, to make an appointment with a specialist remains complicated with often very long delays. The telemedicine solution should not be confined to a single approach. By choice of the cohorts, priority is given to new patients, but also patients who experience complications and elderly patients with reduced autonomy.

To evaluate Diabetes 2.0, one must "test" with defined criteria that produce reliable, readable and replicable results. It begins with a collective space that integrates the needs of the patients in order to bring them a bouquet of services. The second cohort was the one who received the greatest range of telemedicine services.

When evaluating the project, it is important to look to the territory in question, the reasons why or why patients come in order to analyse the support of the project. The patient is at the heart of the project. That is to say, how will he be brought into the project? It is also important to reflect on the method of how to walk alongside the helpers, those who drive the project along. Finally, the challenge of this project is economic with the background idea of setting up prevention methods for future patients who will benefit from feedback from such a telemedicine project.



Given the scale and ambition of the project, in view of current developments in telemedicine and digital aspects, and no longer having the constraints of proposals demands, the rewritten project was envisaged with a wider scope and with the goal of having a generic framework which would allow the development of complementary and articulated subprojects, called "bricks." These are likely to be financed and implemented within a reasonable time according to the financial participation of partners. A communication plan of the project to potential funders is currently underway.

The monitoring of this project, and similar projects are included in the thesis of Corinne Nkondjock. Namely, how ICT can improve the care of patients with chronic diseases while controlling health spending. What are the necessary conditions to change health care organizations in this view, and especially what the real needs of aging patients with chronic illness living at home?

Since the beginning of the thesis, Corinne Nkondjock was able to participate in the early reflections of the project 2.0 Diabetes and has continued to follow the evolution of this project which has been slowed for financial reasons. This is an innovative project that requires real, substantive work and the comparison of similar projects in Europe. The search for understanding the needs of the population of elderly patients with chronic diseases drove Corinne Nkondjock toward a new professional project, coordinating nursing home service project in Hauts-de-Seine Department (92). This new position will enhance her research and enable her to build a concrete picture of the contribution of ICT in the management of patients at home and their limitations.

7. New projects for Healthcare innovations on territories

GPS Diapason corresponds to new approaches to innovation in coordination, consistency and readability of Healthcare management on the territories which meet the new perspectives of "territorial coordination of supports" enhancing in particular the role of PAERPA, CLIC or GPS.

In 2003, the Carayon's report on Economic Intelligence had stressed the vital link between business competitiveness and social cohesion.

From the perspective of promoting innovation on territories (which we consider as Territorial Intelligence), the Godet - Durance - Mouli report (2010) emphasized the role of the Health field as an important innovation's field, pointing in particular the experience of Healthcare Networks (in French, *réseaux de santé*).

At territorial level, institutional coordination is now conducted by the ARS, in relation to Departement Councils (*conseils généraux* became *départementaux* in 2015). To this end, the ARS have specific funds as regional intervention fund (FIR ²¹) . Just like what happened in Canada (Quebec), meta-networks develop in a

²¹ In French, *Fonds d'Intervention Régional*.



perspective of "integrative innovation" valued by M.-A. Bloch and L. Henault (2014). For them, a good approach of integrative innovation is the creation of a CLIC in a territory and then a CLIC Network, then a CLIC – Healthcare Network - MAIA, and finally a CLIC - Healthcare Network- MAIA-PAERPA. They quote the case of CLIC – Healthcare Network – MAIA in Seine-et-Marne Department and that of Paris Centre (2014, 277).

Other achievements correspond to this goal, as the case in the Hautes-Pyrénées Department (Midi-Pyrenees region). It began with the Palliative Care Network Arcade (developed by the Local Disease Office or CPAM ²² as a coordinated care network) at the beginning of the 2000s) and recently develop a partnership with the new MAIA.

In the department of Ariège, in Saint-Girons, the Echo Health (*Echo Santé*) Healthcare Network located within the CHAC ²³ is closely articulated to the local home hospitalization structure (HAD) and the new MAIA but on ... different actions territories ... which cannot optimize the co-operations in a first time.

M.- A. Bloch and L. Henault outline in the conclusion of their work several possible improvements for the future. Their first goal is to contribute to "give an overview and inform various stakeholders (2014, 272) to promote ownership by the actors of the new concepts with the essential dimension of the need for information of patients about their disease and the institutions around them.

They also highlight the notion of "shared care" that emerged in Quebec a few years ago, focused on primary care and home care. With the objective to convince health professionals to call on expert resources when they are not able to respond to the patient's need. It was already the idea of the "Guide for Healthcare Networks" published by the DGOS (2012) with the concept of "territorial coordination support" ²⁴.

They also stress the need to "renew modes of innovation" in two complementary ways. First "integrative" innovation that fully takes into account the context, capitalizes on the existing organizations and develop new devices, with the aim of added value in conducting actions. It must also tackle the issue of disadvantaged areas. They insist on "medical deserts" where there is little potential innovation. They propose the concept of "solidary" innovation: develop innovative devices on disadvantaged areas from neighboring territories better provided (2014, 278 - 279).

We must also mention the European dimension. If Health issues are always managed at the national States level, European projects have enabled significant progress as epSOS (2008 - 2014) ²⁵ for the mobility of patients in the European

²² In French, CPAM : *Caisse Primaire d'Assurance Maladie*.

²³ CHAC : *Centre Hospitalier Ariège Couserans*, corresponding to the Heath area (*bassin de santé*) around the town of Saint-Girons.

²⁴ In French, *coordination territoriale d'appui*.

²⁵ EpSOS : <http://www.epsos.eu/france.html>

The main goal is to encourage the mobility of citizens in the European Union by promoting the interoperability of health information systems, especially the Electronic Health Record with the aim of



Union.

We may also mention the Carewell Project ²⁶ for the Development of a New Organizational Model Based on Integrated Care for Chronic and Elderly Patients through ICTs developed simultaneously in 9 European countries and coordinated by Spanish Basque Country organizations.

8. Conclusion

This paper corresponds to a work in progress. We propose different tracks from reflections around experiments which we are associated.

Beyond revisited DMP (*Dossier Médical Personnel*), we have mentioned in particular the concept of Personalized Care Plan (PPS), the experiments in Interface Organizations, as GPS Diapason, whose mission is animation of the territory of Seine-et-Marne and testing of innovative practices involving the patient, especially diabetic, around the telemedicine project "Diabetes 2.0" (including the Healthcare Network Revesdiab). In the future, with co-operations with GCS Diapason or Bronchiolitis Network we will discuss the concept of care pathway in its different approaches, especially for "complex patients".

We will propose an extension of the perspectives of the situational and interactional semiotics to feelings and emotions of the actors, especially for patients and their families in a dynamic process of change and continuous improvement. We thus situate in new approaches to innovation everyday (Alter, Godet) with a more integrated experience, emotions, feelings and needs of patients for a co-production of services on the model of Anglo-Saxon empowerment. We will insist particularly on the role of emotions in the services' relationship, in our case, in the healthcare sector, with the specificity of "complex" patient. We also will work on the development of the new professions around coordination challenges.

In a perspective of organizational innovation in the territories, and in the approach proposed by M.-A. Bloch and L. Hénaut of "integrative" and "solidary" innovation, in a perspective of Territorial Intelligence (resilience and reliance of territory), we will work to new ways around "frontier" and "interface" organizations corresponding to a new approach of the territory from the perspective of "sustainable development" according to the Brundtland Report (1987) which cannot be reduced only to environmental issues but is also based on two other pillars: economic (growth) and social (education, health and respect for freedoms) in a perspective of rethinking Welfare State (Rosanvallon).

improving the quality and continuity of care. The "summary patient", the "emergency case", the "drug issue" or "e-prescribing" are services designed to enhance patient safety by providing healthcare professionals the necessary medical information for better decision.

²⁶ <http://www.engaged-innovation.eu/discussions/carewell-project-development-new-organizational-model-based-integrated-care-chronic-and>

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I: ICT's role in service development (B)

I1: Mobile services

Chair: Ute Reuter

App communication on Instagram: a netnographic study of a young human brand Isac Elliot

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Today social media, with its increasing popularity and rising user base, is the most fast-moving domain. Within social media, Instagram app is currently one of the fastest growing social media. Social media has been analyzed, but little attention has been paid to visual communication apps, such as Instagram. The purpose of this research is to analyze app communication addressing how human brands engage followers on Instagram. Today many celebrities are brands themselves and offer brand extensions of their personal images. We used netnography (Kozinets, 2002) and observed how a young human brand, a Finnish teenager schoolboy Isac Elliot engages his followers on Instagram. Two main themes emerged from the data: 1. Promotion with an explicit, intended outcome and 2. Pictures creating social contact without an explicit, intended outcome. The latter is less frequently focused on in media research, which has mostly addressed communication with intended outcomes focusing on offers, specific actions and the official identity of a celebrity brand. The findings indicate that Instagram is a suitable media to create social contacts in an intimate way for human brands to become an everyday partner in followers' lives. This is one of the first studies on app communication on Instagram. We contribute to research in social media, app communication, and branding addressing Instagram as an intimate media that is suitable for engaging a human brand into followers' everyday lives.

1. Instagram as a visual communication app

Communication in social media has exploded in recent years. Especially communication using smartphone applications (apps), which we call app communication, has gained more interest among marketers. Social media has several channels through which users can communicate within themselves, as well as, with companies. Facebook and Twitter are established social media platforms, however, in recent years a number of new social media channels have emerged (Walter and Gioglio, 2014). In this paper, we focus on Instagram as a social media channel for visual communication

Instagram is a social media platform for sharing pictures and short videos. Launched in October 2010, Instagram has emerged as one of the top social media platforms boasting of 300 million users in December 2014 (Albergotti, 2014). Available as web and mobile application versions, Instagram has facilitated sharing of more than 20 billion photos since its inception (Instagram, 2015). As a mobile app, Instagram is

free to download to its users and is available as Apple's iOS, Android and Windows Phone operating system versions.

Instagram allows its users to post photos or short videos (not more than 15 seconds) on Instagram, as well as other social media networks (such as Facebook and Tumblr), at the same time. Instagram is a short-form of the combination of the two words 'Instant' and 'Telegram' (Instagram FAQ, 2015) to reflect the ease of use and quickness ('instant') of sharing visual material over the internet (a networking medium, such as wired communication for telegrams). When using Instagram as a mobile app, photos and videos can be clicked directly with the phone camera, or, they can be uploaded from existing data on the phone to Instagram. One of the most essential use properties of Instagram is that it edits all the photos to acquire a square shape thus creating a uniform 'Instagram' photo specification.

Users can add more information to their photos by naming the location where the photo was taken, a short description of the photo and provide a specific theme or topic to the photo by adding a 'hashtag' keyword. The 'hashtag' keywords are used for structuring the multiple themes that users classify their photos in Instagram and is similar to the structuring mechanism used on other social media sites such as Facebook and Twitter (Pylvänäinen, 2014). With the help of hashtag (#) keywords, any user on Instagram can search and look for photos or short videos under a particular theme that is represented by the hashtag keyword. Thus, if twitter facilitates user-to-user discussions with text and other media (such as photos) under specific hashtags, Instagram is specifically used for visual user-to-user communication through photos and hashtag classifications.

The unique feature of Instagram is the availability of a number of photo filters that users can utilize to modify their pictures. The filters add special effects and/or various color tones to the original picture and are used for adding specific experiential aspects to the pictures, such as 'warmth', 'brightness' or 'sepia' (for evoking memories of black and white photo era).

Assessing the growing potential and future popularity of Instagram among social media users, the largest social media network Facebook acquired Instagram for a value of \$1 billion in April 2012, just after Instagram had launched its Android mobile app. (BBC News Technology, 2012). Among several strategic reasons, social media experts have often cited the strength of Instagram in the field of photo sharing as one of the key reasons for this acquisition (Hill, 2012).

On Instagram, each user can create a personalized Instagram profile that functions as the personal 'photo folder'. The photos in the folder can be shared to friends or be made public, where the users who can see the photos can both 'like' and/or comment on the photos. Users who wish to have a more private profile can choose their settings to a specific privacy level.

Users exhibit specific and distinct Instagram use profiles. Hu et al. (2014) have identified five distinct types of users based on their Instagram use patterns including the types of photos shared, frequency of sharing, and groups where photos are shared. They also concluded that the number of followers that an Instagram user has is independent of his/her photos that are shared.

In a similar attempt to classify Instagram users based on age, Jang et al. (2015) have investigated teenage users and they have concluded that teenagers post more self-photos (selfies) and express their self-identities through Instagram photos, as compared to adult users. Thus, Instagram is instrumental in the expression of self-identities of its users primarily through two methods: a) By sharing photos that reflect the user identity, and b) by commenting and liking other user photos, in turn exhibiting personal evaluations and opinions.

2. Celebrity branding

One of the key characteristic of Instagram users is that it is the top social media preferred channel for celebrities to connect with their fans. Out of the top 100 accounts on Instagram, around 75 are owned by celebrity users such as sport celebrities, music celebrities and actors (Albergotti, 2014). To facilitate the celebrity-to-fan relationship authenticity, Instagram announced in December 2014 that it would start offering verified 'badges' for celebrity users, in order to verify the identity of celebrities to their followers on Instagram (Albergotti, 2014).

Several celebrities use Instagram to share images of their personal and professional everyday life events with their fans. For instance, Instagram is a popular social media channel to inform and promote music concerts, sports games, special events as well as everyday life mundane events in the life of celebrities. In his analysis of the phenomenon of artist-consumption in social media, Victorzon (2014) argues Instagram to be an appropriate medium through which it is possible to get a personal glimpse into an artist's life. This is important in facilitating artist-consumption in social media as Instagram is instrumental in forming a personal bond between social media/Instagram users and the artists they follow.

Whether the brand refers to an artifact, service or idol, a brand is determined by brand knowledge created in customers' minds by marketing programs and activities. Brand knowledge includes all thoughts, aspirations, feelings, perceptions, images and experiences that are linked to the brand in the minds of customers.

In this paper, we focus on celebrity brands. In the past decade, the number of celebrities and celebrity brands has increased dramatically due to the social media landscape. As a result, celebrity branding has emerged as a clear trend among audiences, who seek to be noticed in the entertainment field. A celebrity brand is defined as "a clearly defined personality and reputation of a well-known or a famous person who professionally labels, manages, or promotes him- or herself to consumers and other stakeholders for the purpose of commercially leveraging this unique image" (Kowalczyk and Royne, 2013:212). In the brand context, academic research has somewhat neglected the recognition of celebrity branding by limiting its efforts to celebrities as endorsers. Today many celebrities are brands themselves and offer brand extensions of their personal images. (Kowalczyk and Royne, 2013).

Likewise, the amount of so-called human brands has increased due to the digital entertainment market. A human brand refers to "any well-known persona who is the

subject of marketing communication efforts” (Kowalczyk and Royne, 2013:213). A celebrity can be conceptualized as a human brand and at times, the concepts are used interchangeably (Thomson, 2006; Moulard et al., 2015). Human brands or celebrities are introduced as both exceptionally special and very ordinary. Their value of celebrity is based on their unique personality and attractive qualities, but at the same time, they are treated as ordinary people facing the disappointments, problems, enjoyment and delights of everyday life. By doing so, the social and cultural barriers between the customer and the celebrity are removed leading to a strong attachment of familiarity and a relationship of intimacy between the celebrity and the customer. A strong emotional bond between the two is created. As a result, contemporary celebrity culture has succeeded to transform the so-called sophisticated and well-known into familiar, ordinary and intimate figures, which everyone knows or ought to know. The distance between the public and the famous is faded away and equally, the celebrity experiences the routines of everyday life of ordinary people. (Furedi, 2010)

In the customers’ world, brands acts as symbols for psychological and social purposes to express personal identities and to facilitate interactions with others. The customers’ self-concept influences their consumption behavior and acts as the sum of thoughts and feelings about themselves with respect to others. The self-concept contains two sides; actual self is the way how an individual perceives him-/herself, whereas ideal self reflects to how the individual would like to perceive him-/herself. Based on the self-concept, the customer acts in various ways to reach a condition, where the actual matches the ideal, influenced by self-esteem (or self-enhancement) and self-consistency (or self-knowledge). (Choi and Rifon, 2012)

Customers move constantly symbolic propensities out of brands into their personal lives for forming aspects of their self-concept and the world. Younger customers even borrow from a celebrity they admire in their identity construction. The celebrity becomes an exemplary, inspirational figure of cultural meanings relevant to their own personal development. A celebrity can represent a reference group, either actual or imaginary, that has a significant relevance on the younger customers’ evaluations, aspirations and behavior. (Choi and Rifon, 2012)

Typically, customers form strong attachment in the relationships of human brands. Thomson (2006) states that “attachments are a type of strong relationship that people usually first experience as children with their parents; later in life, these attachments routinely develop with other targets, such as human brands” (Thomson, 2006:105). Relationships involving human brands are similar to interpersonal relationships in many aspects. Customers experience these “seeming face-to-face” relationships with human brands as “as if they were in the circle of one’s peers” (Thomson, 2006,105). The human brand relationships have the same expectations, cognitions, emotions and behavior than so-called normal interrelationships and the customers consider a human brand as a pleasant companion, a good friend or even a romantic mate. However, these human brand relationships are not as truly interactive as normal interrelationships. (Thomson, 2006)

In this study we focus on an image sharing app, Instagram, where people can share images with friends and other followers with no or minimal text. Instagram was the fastest growing social network in 2014 (Techcrunch, 2014) Image sharing apps have

also started to interest companies, and many brands have created accounts and used Instagram (FastCompany, 2014; Walter and Gioglio, 2014).

Despite the success of image-based app communication, to date, it has gained little interest in marketing research. As a result, there is a somewhat continuous chaos among practitioners and a small amount of academic studies emphasizing image-based app communication. (Kaplan and Haenlein, 2010; 2012; Davis et al., 2014; Enginkaya and Yilmaz, 2014). To address this gap, and to the best of our knowledge, this is among the first papers to focus on app communication on Instagram.

The specific purpose of this research is to analyze app communication addressing how human brands engage followers on Instagram. Today many celebrities are brands themselves and offer brand extensions of their personal images. The amount of so-called human brands has increased due to the digital entertainment market. A human brand refers to “any well-known persona who is the subject of marketing communication efforts” (Kowalczyk and Royne, 2013:213).

We draw on Thompson (2006), who identifies that the human brand relationships have the same expectations, cognitions, emotions and behavior than so-called normal interrelationships and customers may consider a human brand as a pleasant companion, a good friend or even a romantic mate.

3. Engagement

In an increasingly fragmented media society, brand communication is a challenging activity as there are several sources of information competing for the customers' minds (Hanna et.al., 2011; Solis 2011). The primary motive of social media users is to communicate and engage with fellow users (Lin and Lu, 2011; WeAreSocial 2015b). There are, however, significant number of users, who follow brands and share brand-related content on social media (Solis, 2011).

Customers who follow brands on social media are found to be more aware of brand news and activities (de Vries, Gensler and Leeftang, 2012). Brand communication content plays a vital role in attracting customer attention on social media, where specific efforts are made to attract deeper attention of the customers (Solis, 2011; Walter and Gioglio 2014). One of the key features of social media is that brands can utilize social media channels for deeper attention as customer engagement platforms. Brodie et. al (2011) define customer engagement as:

"Customer engagement (CE) is a psychological state that occurs by virtue of interactive, cocreative customer experiences with a focal agent/object (e.g., a brand) in focal service relationships. It occurs under a specific set of context-dependent conditions generating differing CE levels; and exists as a dynamic, iterative process within service relationships that cocreate value."

Social media users are classified into different types according to the level of engagement (Hellberg, 2015). Users, who engage the most, are labelled as influencers (Peters et.al., 2012) and they are followed by other users in social media communities. On the other end of the scale are users who watch, read, and consume

content online, yet do not engage in a discernible way. Such users are labelled as lurkers (Chen and Chang 2013; Crawford 2009; Heinonen 2011; Schneider, von Krogh and Jäger, 2012). Lurkers do not engage sufficiently with brands because of several reasons – such as, shyness, inability to devote time, desire to remain anonymous, or the volumes of content being unsuitable (Schneider et.al., 2012). Thus, brand managers strive to have as many influencers as possible to engage on social media, whereas at the same time making efforts that users do not fall into the lurkers category.

Instagram followers engage at different levels as the channel and app facilitates several levels of engagement. Through Instagram, simplest engagement activity is liking a picture, whereas a high engagement activity would be to post and share an original picture with hashtags. Instagram is a visual content social media channel, therefore the engagement of followers is dependent on the visual content that users will like to engage with. Engagement on Instagram would thus require the visual content to be appealing and specifically engaging to the target audience. A user may take or share a screenshot of another user's image and post it as his/her image. This action reflects an even higher level of engagement for the brand associated with the image.

Attaining customer engagement on social media has no standard recipes for brand managers (Brodie, Hollebeek, Juric and Ilic, 2011; Hollebeek, Glynn and Brodie, 2014; Solis, 2011) and an overarching engagement approach is difficult to develop. Hollebeek et. Al., (2014) presents a consumer brand engagement conceptualization and measurement scale, developed with the help of Facebook, Twitter and LinkedIn users. The conceptualization, however, does not explain the underlying motives for users to engage with specific content more than others, and is channel dependent. Thus, customer engagement for visual social media channels like Instagram is not yet adequately researched.

4. Method and findings

The human brand in this study is a Finnish school boy, a young pop artist, singer Isac Elliot Lundén, with an artist name Isac Elliot. He published his first record in 2013 when he was thirteen years old. He has active fans in addition to his home country in Norway and Sweden. In 2014 he was nominated to be the "Innovator of The Year" by Spotify in the Finnish Emma Gala for using digital media to be in contact with his followers. Currently Isac Elliot is trying to access the U.S. market. In just couple of years, he has transformed from a teenager schoolboy into a human brand.

We used netnography (Kozinets, 2002) and one researcher observed for one year (2013) how Isac Elliot as a human brand engages his followers on Instagram. The target was Isac Elliot's Instagram page, and all pictures and videos he had published. In order to answer our research question how human brands engage followers on Instagram, we addressed the following sub-research questions in our netnographic study: 1. What kind of pictures/videos does Isac Elliot post to his followers?, and 2. What type of app communication does he use in his postings?.

First all 522 pictures and videos (in 2013) were categorized based on their character. The accompanying brief text descriptions were used as a supporting criterion for our categorization. The analysis resulted in three main categories: (1) artist pictures/videos, (2) pictures/videos of Isac Elliot's everyday life, and (3) fan pictures/videos. The first category included all pictures related to his music career (promotion pictures, pictures of instruments, concert/ studio/interview pictures, pictures of shooting a music video, pictures of film shooting trips etc.). This category also includes such pictures that don't directly show his music career, but where the relation to career is described in text, for example "Now I will go to New York to shoot my new music video". Second category, pictures/videos of Isac Elliot's everyday life, expresses him as a 'normal person' and doesn't relate to his music or career. They are pictures of his family members, friends and his dog, pictures of what he eats, his home, school etc. The third category, fan picture/videos, shows Isac Elliots fans, fan post and pictures that fans have sent him.

In the send phase, all pictures and videos were categorized into two categories: (i) pictures with an explicit purpose, and (ii) pictures without an explicit purpose. Pictures with an explicit purpose included pictures, where he in a way or another communicate with fans or is marketing himself. Some pictures were presented with a question to the fans, a competition to engage his followers, advertisement for his new music, concert, tours, videos, products, events etc., often posted with a hashtag. In addition, such pictures are included into the explicit purpose category, where Isac Elliot specifically addresses his fans, for example thanks them for one million views in Youtube. The second category, pictures without an explicit purpose, includes pictures where Isac Elliot for example tells his followers what he has done or where he has been, but doesn't call for any kind of response, and there is no explicit marketing or information of future events, his music or career.

Table 1 summarizes findings and shows that the most pictures in Isac Elliot's Instagram profile are about his artist career (383 pictures/videos, ca 73% of all pictures/ videos in 2013). However, 124 pictures/videos he published in 2013 present his everyday life, which counts for 24 % of all pictures/videos. Only 16 pictures/videos of all 522 are fan pictures.

Table 1 Different types of pictures/videos that Isac Elliot has published in his Instagram profile in 2013.

Type of pictures/videos	No of artist pictures / videos	No of pictures/ videos of his daily life	No of fan pictures/ videos	Total
Pictures with an explicit purpose	214	42	7	263
Pictures without an explicit purpose	168	82	9	259
Total	382	124	16	522

The findings reveal that Isac Elliot actively engages his followers on Instagram. He distributes approximately two postings per day. We did a thematic analysis, and two

main themes emerged from the data: 1. Promotion with an explicit, intended outcome and 2. Pictures creating social contact without an explicit, intended outcome. We further analyzed what kind of app communication is used in the promotion pictures with an explicit, intended outcome. We identified six categories: 1. Marketing promotion of concerts, music, products, events etc. (42%), 2. Use of a hashtag (#) that directly links to Isac Elliot (32%), 3. A specified message to his followers (10%), 4. Questions to his fans (7%), 5. Competitions or promotion of competitions (5%), and 6. Voting or promotion to vote (4%).

Isac Elliot frequently uses hashtags in his postings. 85 pictures/videos (32%) of the pictures/videos with an explicit purpose include hashtags. Hashtags may also engage followers into direct action, but not as directly as a call for voting or competing.

Even if Isac Elliot actively promotes his human celebrity career on Instagram, over 40 % of the pictures/videos are presented without an explicit, intended outcome. We further analyzed such pictures/videos and found that ca 50 % of the pictures without an explicit, direct outcome focus on Isac Elliot's everyday life. Many pictures were taken at his home, such as chilling with his dog or getting ready for school. The findings portray a young human celebrity, who using app communication, up to some extent shares his everyday life with his followers and becomes part of his followers' daily lives as they check his postings on a daily bases.

5. Discussion

In today's media density, the challenge is to draw people's attention and in specific to engage them to a brand. Brand managers require information about the ways in which users engage with brand content. A high brand engagement causes the rband to remain relevant for its followers and creates strong word-of-mouth, positive attitude, and strong brand loyalty (Peters et.al., 2012).

Instagram is a specific type of social media channel that facilitates visual user-to-user communication. Kaplan and Haenlein (2010) have proposed a social media classification matrix under the categories of 'self-presentation' and 'media richness' (Table 1).

Table 1: Social Media Classification (Kaplan and Haenlein, 2010)

		Social presence/ Media richness		
		Low	Medium	High
Self-presentation/ Self-disclosure	High	Blogs	Social networking sites (e.g., Facebook)	Virtual social worlds (e.g., Second Life)
	Low	Collaborative projects (e.g., Wikipedia)	Content communities (e.g., YouTube)	Virtual game worlds (e.g., World of Warcraft)

In this classification schema, Instagram would occupy a similar position as Facebook that is characterized by high degree of self-disclosure to other users and a medium degree of media richness. The unique feature with Instagram is that it is specifically positioned as an application for photo sharing, in contrast to Facebook and Twitter. Facebook is a multiple media sharing environment and supports sharing of text, videos (of considerable length) and even virtual games. On the other extreme, Twitter facilitates a succinct textual conversation restricted to 140 characters among users. Instagram possesses the agility of Twitter combined with the visual richness associated with Facebook.

One of the key characteristic of Instagram users is that it is the top social media preferred channel for celebrities to connect with their fans. Out of the top 100 accounts on Instagram, around 75 are owned by celebrity users, such as sport celebrities, music celebrities and actors (Albergotti, 2014). To facilitate the celebrity-to-fan relationship authenticity, Instagram announced in December 2014 that it would start offering verified 'badges' for celebrity users, in order to verify the identity of celebrities to their followers on Instagram (Albergotti, 2014).

Several celebrities use Instagram to share images of their personal and professional everyday life events with their fans. For instance, Instagram is a popular social media channel to inform and promote music concerts, sports games, special events, as well as everyday life mundane events in the life of celebrities. In his analysis of the phenomenon of artist-consumption in social media, Victorzon (2014) argues Instagram to be an appropriate medium through which it is possible to get a personal glimpse into an artist's life. This is important in facilitating artist-consumption in social media as Instagram is instrumental in forming a personal bond between social media/Instagram users and the artists they follow.

Our findings indicating that a human brand may become an everyday partner in followers' lives are supported by Thompson (2006), who identifies that the human brand relationships have the same expectations, cognitions, emotions and behavior than so-called normal interrelationships and that customers consider a human brand as a pleasant companion, a good friend or even a romantic mate. The findings show that in Isac Elliot's Instagram postings are close to as many pictures/videos with an explicit (214), and without an explicit purpose (168). In the pictures/videos without and explicit purpose, he more presents his identity as a "friend". We contribute to research in social media and branding addressing Instagram as an intimate media that is suitable for engaging a human brand into followers' everyday lives.

The study has implications for researchers and managers. While Instagram is a potential media to engage followers in the media communication jungle, its character and potential media effects are currently a gap in app communication and brand engagement research. This offers avenues for celebrity-follower one-to-one engagement studies, as well as future studies on other types of brands that are keen to intimately engage with their followers.

We have limited our study on human brands, and to one celebrity on Instagram, who is popular among teenagers, and especially girls. Therefore, we encourage

researchers to address celebrities for different target groups and different visual social media channels, such as Pinterest and Tumblr, which are both emerging visual apps especially targeted for teenagers. While app communication opens up interesting research questions for brand research, we encourage future research to extend to other types of brands on Instagram. Furthermore, even if recent research indicates that lurkers interact with brand content on social media (Chen and Chang, 2013), their engagement is not manifested in any discernible form, and current research has addressed limited attention on engagement of lurkers.

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Electronic Auctioning of Services

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In times of high financial pressure on business units, electronic auctioning devices are a viable possibility to save costs in purchasing services but meet resistance in business practice. This resistance is subject of a quantitative-empirical survey. Results show that hindrances are mostly based on management team, human capital and external resources. Considering the importance of external resources, the relational resource-based perspective is an especially appropriate theoretical background for this scientific paper. In addition, case study research identifies ways to overcome these hindrances. The creation of 'magical moments' and communication between stakeholders prove to be acceptable solutions.

Key Words

Electronic auction; purchasing services; services procurement; electronic procurement; service auction; electronic marketplace; digitalization.

1. Introduction

In times of ever increasing financial pressure on business units, the utilization of electronic purchasing devices such as electronic auctioning, electronic catalogue management and electronic marketplaces is a viable possibility to achieve cost savings in purchasing, especially in purchasing of material. A large share of this cost savings potential is achievable in purchasing services as well, even if considering the characteristic features of services. Of the three mentioned ways of electronic purchasing, electronic auctioning is the one with the highest cost savings potential. Therefore, this scientific paper concentrates on electronic auctioning.

However, electronic auctioning of services is a concept which meets resistance in business practice. This research paper highlights several hindrances in electronic auctioning of services. Three different problem areas are tackled: obstacles within the company purchasing the services itself, obstacles grounded in the relationship between the company purchasing the services and the company offering the respective services and also obstacles based on the involvement of the intermediary who provides the electronic auctioning devices.

Furthermore, this research paper shows ways to overcome these resisting forces in business practice in general and in the facility management branch in particular. Especially important prove the creation of 'magical moments' for the company's own employees as well as the improvement of communication between the company's own employees with the employees of the intermediaries and with the employees of the companies offering the procured services.

Hence, this research paper provides an overview over business practice in electronic auctioning devices and offers guidance in what concerns their actual implementation. Theoretical Background and Research Question

The actual implementation of ICT in the procurement process leaves much to be desired (Quale, 2005). Improvements can only be achieved if a so-called “internal customer satisfaction” (Croom and Brandon-Jones, 2007: 295) with the (potential) implementation is reached. Ellram and Zsidisin (2002) propose that the degree of closeness between the purchasing company and the (potential) subcontractor strongly determines the tendency to use e-procurement. This means that purchasing partners which implicitly trust each other are more likely to use e-procurement in general and electronic auctioning of services in particular. Arnold and Schnabel (2007) researched the role of reverse auctions in purchasing material and Kumar and Chang (2007) analyzed the cost savings potential of reverse auctioning. Laumer (2011) gave an overview over recent ‘resistance to change’-publications with information and communication technology (ICT) component. Rajkumar (2001) for example elaborated on the importance of system integration for e-procurement and concluded that the ICT systems of purchasing company and subcontractors have to be compatible for successful e-procurement implementation. Emphasizing a more theory-based approach, Bartezzaghi (2007: 195) proposed that “it is necessary to consider the state of the art in innovation adoption and diffusion models, with a specific focus on ICT” in order to explain e-procurement adoption. This argument should furthermore be expanded by resource-based theory and the relational view (van Weele and van Raaij, 2014) as well as the resources of the purchasing company and the external resources from subcontractors and intermediaries are of utmost importance for the whole procurement business. Reuter (2013) for example offered insights into electronic procurement of services from a relational resource-based perspective. Relational resource-based perspective in this case means the integration of the relational view (Dyer and Singh, 1998) into the resource-based view (Lavie, 2004). This line of theory integration is especially apt as purchasing and supply management research is, at the moment, not considered to be able to provide insights into the management of subcontractors as external resources (van Weele and van Raaij, 2014).

Croom and Brandon-Jones (2007) stated that there are very few empirical studies which tackle the problem of e-procurement implementation. This is even more so for specific questions such as the topic of hindrances in electronic auctioning of services. First, purchasing of services is not adequately investigated in literature (Bensch and Schrödl, 2011). Especially under-researched is business-to-business service exchange (van der Valk and Wynstra, 2012). Second, electronic purchasing of services is even less well studied. And third, no research projects in electronic auctioning of services other than Reuter (2013) are known to the author.

In this paper, one important influence factor in electronic auctioning of services is scrutinized: the hindrances. If a company thinks about implementing electronic auctioning, it is very important to know which hindrances exist and how resistance can be overcome. Ronchi et al. (2010) asked for the barriers of e-procurement implementation. In their research, they concentrated on barriers related to IT-categories only and did not consider other resource categories. This shortcoming is amended in my paper as human capital, management team, financial resources, organizational capital and external resources are considered.

Figure 1 provides an overview over the different stakeholders in electronic auctioning of services (Reuter, 2013). Central institution is the purchasing company itself which is supported by the intermediary and various subcontractors (1 to n).

To clarify the wording in this paper, different categories of members of the purchasing company are allocated according to relational resource-based argumentation. Members of the management team are referred to as ‘management team’ and members of staff are referred to as ‘employees’ or ‘human capital’. Employees of the sub-contractors and of the intermediary are referred to as ‘external resources’.

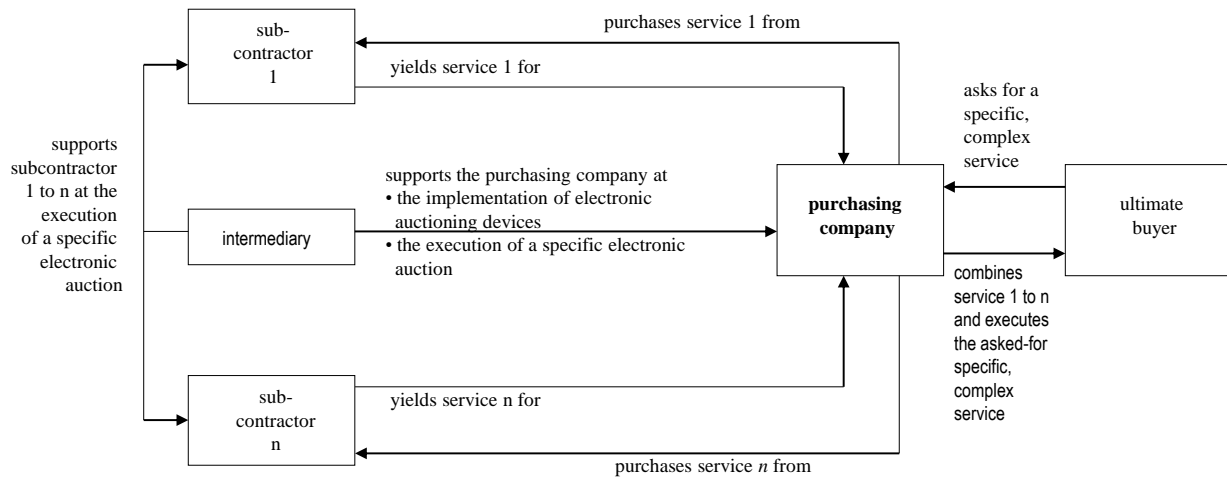


Figure 1: Relationship between subcontractor, intermediary, purchasing company and ultimate buyer

2. Resource-based hindrances

Impeding forces influence the powers which normally would impel the implementation of innovative ICT devices such as electronic auctioning. Seen from a resource-based perspective, the main hindrances can be categorized into hindrances based on human capital, management team, financial resources, organizational capital and external resources.

First of all, the human capital of the company purchasing services can embody obstacles for electronic auctioning of services. The implementation and utilization of ICT in the purchasing of services is often subject to resistance of employees within the company in which the process change takes place (Johnson and Real, 2007). They do not automatically view changes in a positive light only because the management team does so (Reuter, 2015a).

Different causes of human capital's resistance can be isolated. Transformation readiness is a critical factor in electronic procurement in general and in electronic procurement of services in particular (Monczka and Trent, 1991). Advanced knowledge in conventional procurement vests authority within the procurement department. An employee who is equipped with such advanced knowledge tends to hold onto his or her authority. Therefore, the implementation of electronic auctioning devices evokes resistance unless the employee sees some benefit in the change as well. This is even more so if the process change is imposed upon the employee in a top-down way. Then, his so-called 'power of usual practice' turns out to be a mighty hindrance (Aladwani, 2001) for electronic purchasing in general and electronic auctioning in particular.

Resistance to change is often motivation-induced. Motivation can originate from positive stimuli and team development activities. Focusing solely on incremental process improvement tends to blight radical process innovation initiatives (Reuter, 2013 and

2015a). Employees fear to loose competencies. Most employees do not fear new processes but fear to lose power and knowledge. Even clearly positive changes can provoke such fears and insecurities (Kotter and Schlesinger, 1979). Application of Sheth's (1981) argumentation on risk perceptance leads to the following conclusion: The more pronounced these fears are, the more important becomes the employees' resistance against electronic auctioning of services and the more intensive is the employees' risk perceptance.

Apart from the discussion about transformation readiness and transformation ability of the employees, a purely pragmatic reason can hamper the utilization of electronic auctioning of services. In pre-ICT times, each and every company purchased its services from subcontractors without using electronic auctioning devices. Hence, most companies with a few years of company history have already developed purchasing processes which do not integrate electronic auctioning. The implementation of electronic auctioning of services is a time-consuming process. Especially small and medium-sized companies spare the effort to implement new devices as the employees concerned with purchasing services have other important topics on their mind. The clincher in this case not to think about electronic auctioning of services is a pure lack of manpower.

A second important category of obstacles within the company purchasing services goes back to the members of the management team. On the one hand, the management team decides on the importance of purchasing services - in other words: the buy-quota of services - within a company. This buy-quota, however, influences the implementation of electronic auctioning. If the purchasing of services is a single sensation within a company, the incentive for the management team to think about improving the efficiency or the costs of this onetime experience is near zero. This will not change until the number of purchased services rises significantly. Then, the necessity to define a concise service purchasing process arises. In the course of this service purchasing process definition, an ICT-inclined management team will certainly think about ways to alleviate purchasing services. Hence, the influence of the management team on the buy-quota and therewith on electronic auctioning of services should not be disregarded.

On the other hand, the management team often overlooks resistance in its 'technocratic euphoria' (Reuter, 2013) or otherwise, completely opposes electronic auctioning of services. Such complete opposition nips electronic auctioning initiatives in the bud. Without management team support, electronic auctioning initiatives cannot succeed within the purchasing company (Reuter, 2015a).

Furthermore, hindrances can be based on financial resources, or more correctly, the lack of these. A high buy-quota goes along with the need to maintain relationships with subcontractors. This is a costly thing. Theoretically, utilizing electronic purchasing devices such as electronic auctioning reduces these costs (Brynjolfsson and Hitt, 2000). In practice, however, the implementation of electronic auctioning devices is costly itself and the positive, cost diminishing effects come across not until some time has passed. Hence, practitioners see the short-term costs and tend to overlook the long-term benefits. Hindrances based on financial deliberations could therefore be that the utilization of electronic auctioning is thought of as not profitable and that the initial procurement of the electronic auctioning device itself seems to be too expensive even to consider the implementation.

Sometimes, the existing organizational capital within the purchasing company can be problematic as well. High expectations placed on the procurement function within the company need to manifest themselves in adapted organizational structures (Schneider and Wallenburg, 2013). Each company with experiences in service purchasing

has a more or less well described service procurement process. Hence, the better the description of the service procurement process is, the higher is the incentive for the respective employees with expert knowledge to preserve this well-known and easy-to-handle procurement process. The already existing 'normal' procurement process can be classified as organizational capital of the company with the tendency to hinder the implementation of electronic auctioning. In this case, the service procurement process does not support electronic auctioning easily.

Last but not least, electronic auctioning implies that the purchasing company has a need of services which they cannot provide with their own employees (in resource-based terms: they need the support of external resources). The employees of the sub-contractor are forced to deal with electronic auctioning devices as well, if the procuring company uses electronic auctioning. The utilization of electronic service auctions often requires cooperation between offering and procuring company and an intermediary as well. In this case, the intermediary is a company offering ICT-based auctioning devices and support in their utilization. All three companies in question consist of many different employees. Most of them lack the awareness that changes are a necessary and unavoidable by-product of process improvement. Hence, all the employee-based causes of resistance which were discussed for hindrances based on human capital (see the first few paragraphs of this selfsame chapter) are applicable for the sub-contractor's employees as well.

Furthermore, there are hindrances which arise especially because of the cooperation between purchaser, subcontractor and/or intermediary. Cooperative relationships develop between the company procuring services, the company offering the procured services and/or the intermediary. These relationships can be an impeding force (Monczka and Trent, 1991) as hierarchies within both companies and the network between the companies have to be balanced. This is especially problematic if the employees of the subcontractor see electronic auctioning "as a tool that buyers use to increase and exploit a position of power in the relationship" (Caniels and van Raaij, 2009: 12). Often, in this case, the offering company outright refuses to take part in any kind of electronic auctioning of services.

3. Quantitative-empirical research

3.1. Questionnaire and analysis

The existence and importance of most of the resisting forces mentioned in section 2 are exemplary proven by a quantitative-empirical survey within the facility management branch in Germany. The questions in the questionnaire were closed questions with five answer alternatives ranging from 'fully accept' to 'do not accept at all'. The consistence of the questions was tested prior to the actual survey. The pretest included 30 facility management or survey experts. The survey itself took part in May and June 2011. All in all, 1,048 facility management companies were asked to participate of which 134 answered questions relevant for research about electronic auctioning of services, resulting in a response quote of 12.79%. Participants were asked per e-mail to answer an online questionnaire.

Figure 2 shows that 16 companies used electronic auctioning of services at the moment of questioning. 96 of the analyzed companies did not use electronic auctioning of services and had no ambition to use it in the near future. 22 of the analyzed companies did not use electronic auctioning of services at the moment of questioning but

plan to use it in the near future. Hence, 88% of the sampled companies provide relevant information for the quantitative-empirical analysis in question.

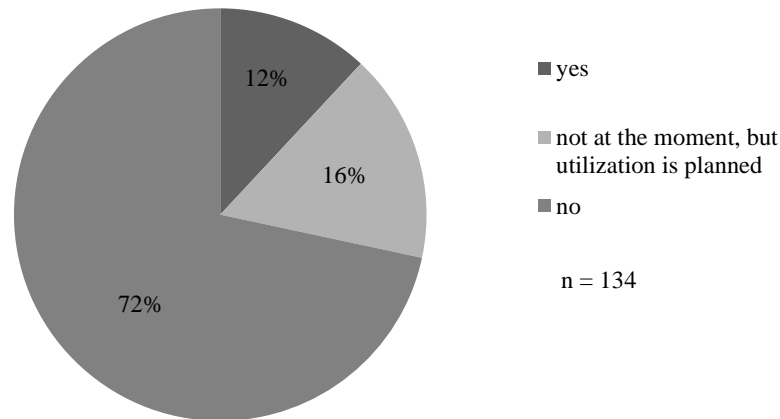


Figure 2: Utilization of electronic auctioning of services

Table 1 summarizes the main hindrances in electronic auctioning of services from the viewpoint of those companies which did not use electronic auctioning at the moment of questioning.

<i>Hindrances</i>	<i>Item</i>	<i>Abbreviation</i>
1. management team	refusal of electronic auctioning of services by management team	REFU
2. human capital	not enough manpower	MANP
3. financial resource	utilization of electronic auctioning is not profitable	PROF
	procurement of electronic auctioning device is too expensive	EXPE
4. organizational capital	service procurement process does not support electronic auctioning	SUPP
5. external resources	refusal by offering company (subcontractor)	OFFE

Table 1: Hindrances from the viewpoint of companies which did not use electronic auctioning

3.2. Results and discussion

A different number of companies provided answers to each relevant question (see table 2). As the quantitative-empirical research project is explorative in nature, this does not diminish the relevancy of possible findings.

In each column of table 2, three different numbers are given. ALL (the first number on the left) informs about statistical data concerning all companies which did not use electronic auctioning of services at the moment of questioning. PLAN (the left number in brackets) gives statistical data about the group of companies which did not use electronic auctioning of services at the moment of questioning, but plan to do so in the future. NO (right number in brackets) tells about the companies which did not use

electronic auctioning of services at the moment of questioning and have no intention to use it in the near future.

<i>Abbreviation</i>	<i>Quantity*</i>	<i>Mean*</i>	<i>Standard deviation*</i>	<i>Variance*</i>
REFU	103 (21/82)	3.19 (3.76/3.05)	1.401 (0.944/1.465)	1.962 (0.890/2.146)
MANP	45 (11/34)	3.76 (3.45/3.85)	1.209 (0.820/1.306)	1.462 (0.673/1.705)
PROF	90 (19/71)	2.98 (3.58/2.82)	1.349 (0.961/1.397)	1.82 (0.924/1.952)
EXPE	78 (18/60)	3.29 (3.67/3.18)	1.359 (1.085/1.420)	1.847 (1.176/2.017)
SUPP	86 (19/67)	3.13 (3.21/3.10)	1.282 (0.918/1.372)	1.642 (0.842/1.883)
OFFE	86 (19/67)	3.26 (3.84/3.09)	1.16 (0.898/1.177)	1.346 (0.807/1.386)

* ALL (PLAN/NO)

Table 2: Statistical data concerning these hindrances

Table 3 gives an overview over the correlation between items concerning the observed main hindrances for all companies in question. For the majority of correlations, Pearson's r surpasses 0.3. Hence, correlation analysis indicates that there is a common structure within the analyzed data. According to Field (2011), explorative factor analysis is applicable in this case. Principal component analysis and the ensuing scree plots show that it is possible to describe the relevant items in one component. Table 4 shows the results of explorative factor analysis. The Bartlett-test is highly significant (Field, 2011) for ALL, PLAN and NO alike and Cronbach's alpha, which is much higher than the requested 0.35, strongly confirms the construct's reliability (Van de Ven and Ferry, 1980).

Pearson's r	REFU	MANP	PROF	EXPE	SUPP	OFFE
REFU	1					
MANP	.227	1				
PROF	.531**	.190	1			
EXPE	.268**	.249	.665**	1		
SUPP	.270**	.378**	.362**	.528**	1	
OFFE	.357**	.346*	.488**	.502**	.353**	1

** Statistically significant at the 0.01 level; * statistically significant at the 0.05 level

Table 3: Correlation between items concerning main hindrances for ALL

In case of ALL, factor loadings are above 0.5 for each of the tested items. All items are applicable in the description of the respective component. Only the item EXPE could be problematic because of the extracted communality which surpasses 0.5 only slightly. However, as either the extracted communality or the factor loading can be used as arbitration criterion (Hair et al., 2010), the relatively low extracted communality is not important after all. The value of the Kaiser-Meyer-Olkin criterion

(K-M-O) > 0.7 indicates that the construct is quite good in measuring the sample (Brosius, 2006).

Item	Extracted Commu- nality*	Factor Loading*	Con- struct	Cronbach's alpha*	K-M-O*	Bartlett*
REFU	0.622 (0.547/0.370)	0.660 (0.678/0.560)	HINDRANCES	0,648 (0,661/ 0,636)	0,717 (0,669/ 0,684)	0,000 (0,000/ 0,000)
MANP	0.688 (0.523/0.817)	0.593 (0.282/0.218)				
PROF	0.820 (0.558/0.704)	0.783 (0.712/0.768)				
EXPE	0.513 (0.532/0.592)	0.706 (0.707/0.768)				
SUPP	0.663 (0.716/0.403)	0.621 (0.551/0.549)				
OFFE	0.539 (0.532/0.429)	0.731 (0.724/0.650)				

* ALL (PLAN/NO)

Table 4: Explorative factor analysis and test results

In case of PLAN, table 4 shows a few differences. Extracted communalities and factor loadings are significantly lower. Especially the item MANP seems to be problematic with its really low factor loading. However, the value of the extracted communality > 0.5 allows to continue the analysis with this item. It has to be noted that the construct's ability to measure the sample of the PLAN-companies is lower, but still in a medium range (Brosius, 2006). In case of NO, extracted communalities are well below 0.5 for REFU, SUPP and OFFE. But as factor loadings are above 0.5 for these items, they can be integrated nonetheless. The same is true for MANP but for different reasons. For this item, factor loading is too low, but the extracted communality is sufficient. To sum this up, HINDRANCES including the items REFU, MANP, PROF, EXPE, SUPP and OFFE is a reliable construct to measure the whole sample (ALL) as well as the sample groups PLAN and NO.

Item	Wilks Lambda	F	df1	df2	Significance
REFU	.957	25.099	1	560	.000
MANP	.994	3.145	1	560	.077
PROF	.969	17.670	1	560	.000
EXPE	.975	14.384	1	560	.000
SUPP	.997	1.593	1	560	.207
OFFE	.950	29.736	1	560	.000

Table 5: Equality test of group mean values

However, explorative factor analysis has also shown that there are certain differences between the sample groups PLAN and NO. In order to observe these differences in a more convincing and statistically adequate way, stepwise discriminant analysis was carried out.

Wilk's Lambda is quite high for all tested items (see table 5). That means that the predictive value of the items in what concerns their explanatory power could be better (Klecka, 1982). The significance is high or very high for all items except SUPP, thus indicating that the item SUPP will probably be excluded as important variable during the following analysis. This proves to be true as can be seen in table 6.

<i>Step</i>	<i>Item</i>	<i>Tolerance</i>	<i>F-Value of exclusion</i>	<i>Min. D-square</i>
1	OFFE	1.000	29.736	
2	OFFE	.953	19.078	.278
	REFU	.953	14.533	.329
3	OFFE	.935	21.848	.329
	REFU	.951	15.183	.405
	MANP	.976	7.118	.499

Table 6: Stepwise discriminant analysis

Table 6 shows that of the six tested main hindrances (items), three are included in the stepwise discriminant analysis: OFFE, REFU and MANP. These items offer the highest discriminatory power. The following canonic discriminant functions emerge:

$$Y_{\text{non-standardized}} = -2.333 + 0.415 X_{\text{REFU}} - 0.267 X_{\text{MANP}} + 0.567 X_{\text{OFFE}}$$

$$Y_{\text{standardized}} = 0.569 X_{\text{REFU}} - 0.387 X_{\text{MANP}} + 0.684 X_{\text{OFFE}}$$

With the non-standardized canonic discriminant function, the group centroid for PLAN is 0.611 and the group centroid for NO is -0.154. The negative algebraic sign in the case of MANP shows that this item is more important for the NO-group whereas the positive algebraic signs in the cases of REFU and OFFE indicate that these items have a higher importance for the PLAN-group.

<i>Wilks Lambda</i>	<i>Chi-square</i>	<i>df</i>	<i>Significance</i>	<i>Eigenvalue</i>	<i>% of variance</i>	<i>Accumulated variance (in %)</i>	<i>Canonic correlation C</i>
.914	50.309	3	.000	.094	100.0	100.0	.293

Table 7: Statistical data about the canonic discriminant function

The higher the canonic correlation (C), the better is the explanatory power of the respective discriminant function (Klecka, 1982). In this case, the explanatory power of the canonic discriminant function is in the medium range. However, the function is highly significant (see table 7) and 67.8% of the originally grouped cases are classified correctly.

As a result, discriminant analysis shows that there are certain differences between the two groups PLAN and NO. The differences within the items MANP, REFU and

OFFE are most important. For companies which do not use electronic auctioning of services and have no intention to do so in the near future (group NO), the lack of manpower (MANP) is the main hindrance in implementing electronic service auctions. Companies with the intention to use electronic auctioning in the near future (group PLAN) put more importance on the negative attitude of management team (REFU) and subcontractors (OFFE) towards electronic auctioning of services when the question arises why they do not procure via electronic auctioning. Statistically speaking, however, these differences are not as pronounced as first assumed.

4. Qualitative-empirical research

Several hindrances in the implementation of electronic auctioning of services were identified in section 4. Successful ways to overcome these hindrances, however, cannot be found in analyzing companies which do not use electronic auctioning of services themselves. Instead, companies which have already overcome these hindrances and have found successful ways to reduce resistance are of interest. Therefore, methods to reduce resistance are described in detail in two in-depth case studies with companies which already use electronic auctioning of services. Following van der Valk and Wynstra (2012), case study research is used to test the assumptions in question.

4.1. Case study selection, methodology of case study execution and a short overview over the selected companies

The success of qualitative-empirical analysis is determined by the selection of the case study companies (Eisenhardt, 1989). As a sampling strategy, criterion sampling was used. Selection criteria to find the most suitable case study companies were the following.

First, the leading facility management companies concerning their volume of sales were identified. Ten facility management companies had a volume of sales of 350 Mio. Euro or more in Germany at the moment of case study selection. Three of these ten companies volunteered to take part in an extensive, longitudinal case study research: M+W Zander D.I.B. Facility Management GmbH (M+W), Bilfinger Berger Facility Services GmbH (BBFS), and a third company which declined to see their company name published. Therefore, this third company is labelled Full Service Provider GmbH (FSP).

Second, experts within these three companies were asked if the procurement department was taking part in electronic auctioning of services or not. If not, they were asked if they had any intention of implementing electronic procurement of services in the near future or not.

M+W had utilized electronic auctioning of services since 2002. Therefore, M+W was a clear candidate for case study integration in this research project. As for M+W, the firm's development at the time of the first case study interview was determined by continual growth. The company showed a very high subcontract quota (buy component) while its share of in-house services (make component) was comparatively low. The organization of strategic procurement was highly centralized, but operational procurement showed tendencies of decentralization.

BBFS answered that they did not auction services electronically but had an inclination to do so in the near future. Therefore, they were a viable candidate for integra-

tion as case study partner in this research project as well. In 2009, during the case study execution, they started implementing electronic catalogue management of services. In 2010, BBFS had risen to be first of the high-selling facility management companies in Germany (e.g. Hossenfelder, 2010). BBFS's subcontract quota was slightly lower than that of M+W. Meanwhile, the organization of strategic procurement at BBFS was centralized whereas operational procurement was increasingly decentralized.

FSP did not auction services electronically. The interview partners indicated that the company had no inclination to start procuring services electronically in the near future. During the timeframe of case study execution, they did not start procuring electronically. Therefore, the case study I did in this third company does not provide relevant information for the research project on hand.

All in all, five in-depth expert interviews per case were conducted with different employees of the respective procurement departments. Each expert interview lasted at least two hours.

At M+W, mostly closed auctions were used. Participation at electronic auctions was restricted to offering companies which had beforehand passed through an extensive evaluation process. The electronic auction did not serve as a device to unearth adequate offering companies but as a price finding mechanism only. The electronic auctioning software was provided by a neutral intermediary. M+W was very content with the software functions and the support of this intermediary. From the start of electronic auctioning in 2002 until the conclusion of the last case study interview, the same intermediary provided the electronic auctioning software. Hence, the employees of M+W's procurement department showed experience in electronic auctioning of services.

In contrast, BBFS started procuring via electronic auctioning as late as 2010. Hence, the employees of the procurement department had not much practical experience with electronic auctioning at BBFS. But most of the interviewed employees had already gained practical experience with electronic auctioning on the job at other facility management companies, for example at M+W. BBFS used the same electronic auctioning software as M+W. Therefore, especially the employees who had worked at M+W in the past could easily transfer their knowledge in electronic auctioning to BBFS. Mostly closed electronic auctions were utilized and electronic auctioning functioned as negotiation support in pricing.

4.2. Qualitative analysis and discussion

Two questions dominate the following case study analysis:

- (1) Were (or are) the identified hindrances in electronic auctioning of services of importance within the case study companies?
- (2) How did the case study companies succeed in overcoming these hindrances?

Discriminant analysis has shown that management team (REFU), human capital (MANP) and external resources (OFFE) are the most important hindrances in electronic auctioning of services. Therefore, the ways to overcome these hindrances are looked at in detail in the following.

It proved difficult to differentiate between management team and human capital within the case studies. Most of the interviewed experts had experiences at being part of the human capital of their company (in the resource-based meaning) and willingly shared these experiences, but had risen to the status of management team during

their career and offered insights in their viewpoints as well. Therefore, the arguments concerning management team and human capital are jointly presented.

At M+W, management team (the head of the procurement department) and human capital (the employees of the procurement department) worked together in a very close and un-hierarchical fashion. Most of the procurement-related questions and tasks within the company were consequently tackled by the procurement department. This very high degree of centralization of procurement led to a close-knit working atmosphere in purchasing in general and of services in particular. At BBFS, centralization of procurement was less distinctive. Therefore, the procurement department had more supporting tasks related to employees of the company who had no or few experiences in purchasing services. Depending on the attitude of these other employees, electronic auctioning was already a question or otherwise, it was necessary to do a lot of persuading. One expert for example stated that it was really hard to convince a certain facility manager with a need to advertise fire prevention services for bids of the utilization of electronic auctioning. A good deal of communication was necessary to make this certain facility manager come around. Both case studies show that communication between employees is as helpful to overcome attitude-induced opposition as communication between management team members and employees. This is also backed up by the argumentation of Kotter and Schlesinger (1979).

However, the communicability of information rises if the information is adequately customized. Customization works best if so-called 'magical moments' are created (Nowak and Neubert-Liehm, 2011). Both case studies highlight that 'magical moments' emerge if digital and analog communication channels are reasonably connected. This connection helps employees to remember the incident in question in a positive light. For further information on 'magical moments' see Reuter (2013, 2015a and b). At M+W, for example, the first electronic auction was commemorated as a real happening. Written invitations were dispatched to management team members of other departments and to several employees with known purchasing requirements. The actual electronic auction was broadcasted on a big viewing screen, so that each guest could see what was happening and could follow the auction process in real-time. Canapés were served and the successful conclusion of the auction was celebrated with a glass of sparkling wine. Even years after this happening, most employees remembered this very first electronic auction of services with pleasure and spoke positively about electronic auctioning in general. The first electronic auction at BBFS was also seen as a special event, but not to the same extent as at M+W.

At BBFS, only the employees of the procurement department and the employees with purchasing requirements who were directly connected to this special auction took part. Furthermore, the author of this paper was invited to take part. In the final stages of the electronic auction, the head of the procurement department dropped in as well. The electronic auction was broadcasted on a big screen and the employee of the procurement department who was responsible for this auction commented on the progression of the bidding. The auction was actually divided into two lots, each with different service bundles in the context of fire protection services. All the services which formed the two lots had been on the market beforehand. Therefore, it was possible to judge potentially realizable prices before the auction actually started. As the electronic auction proceeded, the mood of the participants changed from skeptical at first to exuberant in the end. The auction was a convincing success from the perspective of BBFS as the partaking subcontractors went into a downward price-spiral. All in all, price savings of approximately 65% were realized. Even the head of the procurement department and the employee with the purchasing requirement, who had both been not really convinced of the cost-savings potential of electronic auction-

ing of services, were exalted. The employees with the purchasing requirement even promised to look into all the other pending warranty contracts and to let the offered prices be confirmed in electronic auctions.

Motivation-induced opposition has proven to be important in both case studies as well. Helpful in this context is if the employees know about the application of electronic auctioning devices as soon as possible. Employees should experience that the implementation of electronic auctioning changes the procurement process for the better. This experience can be brought along by qualification. At M+W, many employees saw only the extra amount of work connected with electronic auctioning (especially during the preliminary stages of the auction itself) and did not realize the benefits (such as high cost savings). This changed after the procurement department had started a qualification campaign for electronic procurement. Each employee with known purchasing requirements was asked to take part in a qualification program offered by the employees of the procurement department and additionally could take part in qualification courses offered by the software provider who allocates the electronic auctioning device. At BBFS, such a qualification process was also under way at the time of case study execution, but had not been sufficiently finished. For both case studies holds true that if the necessary prowess and skills to handle the ICT devices are conveyed to the employees, resistance is minimized. This backs up Kotter and Schlesinger's (1979) argumentation on the reduction of resistance via qualification in general.

Coaching also seems to be an effective way to reduce employees' fears. The slogan "The earlier, the better!" (Gros, 2011, p. 717; author's translation) is very true in the context of the case studies. If a negative opinion about electronic auctioning already started to form, it is always harder to convince such then preoccupied employees or members of the management team. In the latest, the members of the management team should raise the employees' awareness for this process change (Freiling, 2008) when the implementation of electronic auctioning of services is certain. At M+W for example, the employees and management team members were integrated in the process of implementing electronic auctioning from the start, as has been shown in the 'magical moments' section above. Employees and management team were all informed about the intention to procure services electronically before the first electronic auction of services ever took place. Hence, the affected employees and management team members felt integrated in the process change and learned early on about the positive effects and the high cost savings potential of electronic auctioning of services.

Furthermore, conflict management is a means of easing resistance, especially if some employees are 'winners of change' and some are (or see themselves as) 'losers of change'. Some employees associate restructuring of the purchasing process with high costs, high time exposure and low improvement of outcome. If these critical employees can be convinced of potential cost savings and gains in the course of the implementation of electronic auctioning of services, their resistance is reduced. This affirms the argumentation of Szmigin and Foxall (1998) on innovation resistance in general.

At M+W and BBFS, the initiative to implement electronic auctioning of services came from the employees at the respective procurement department. Both were so-called bottom-up initiatives (By, 2005). Therefore, there were no employees of the procurement departments who thought about themselves as 'losers of change'. Conflict management was not necessary in the case of M+W and BBFS. Hence, the better the process change is grounded in organizational practice, the higher is the sustainability of change. There is no compensation for a lack of transformation readiness,

however. Both case studies show that the members of the management team and the employees are equally inclined to change. The transformation readiness does not differ subject to the status of the respective participant.

Furthermore, a cooperation in procurement works out if employees support the co-operation-induced changes. External resources, such as the employees of the intermediary, can compensate for a lack of transformation ability. This compensation normally works better for members of the management team than for employees. At M+W for example, the head of the procurement department already had a very high transformation ability. Therefore, no compensation was necessary on his part, but new employees of the procurement department always had to be instructed on electronic auctioning and several showed a lack of transformation ability at first. In this case, the cooperation with the employees of the intermediary compensated for the missing transformation ability of the rookie employees. At BBFS, the subcontractors participated willingly in the electronic auctioning process. Beforehand, they always had problems in assessing reasons for not getting a certain assignment. With electronic auctioning, documentation is, according to the purchasing experts, really accurate and the transparency of the auctioning process is very high.

In sum, the case studies confirm Ford and Ford (2009) in their assumption that it is reasonable to view resistance as a chance to reach better performance and be more successful.

5. Contribution, limitations and future research paths

From an empirical perspective, the paper's main contribution is twofold. Quantitative-empirical analysis showed that the main hindrances in electronic auctioning of services are management team, human capital and external resources. According to qualitative-empirical analysis, these hindrances can be overcome by communication, the creation of 'magical moments', coaching, qualification, conflict management and compensation. The qualitative-empirical results are also important from a managerial perspective as practitioners can use them as guidelines to overcome resistance in their own company. From a theoretical perspective, the paper's main contribution is to show that the relational resource-based perspective is a theory very well suited to be used in purchasing and supply management research.

As are all research projects, this project is subject to certain limitations. In what concerns the ways to overcome resistance, the small number of case studies impedes generalizability. Also, the fact that only companies with activities on the German facility market were integrated in the survey is a constraint, as Caniels and van Raij (2009) found country of origin and liking of electronic reverse auctions to be closely correlated.

Furthermore, one aspect which has not been discussed in this paper emerged during the case study at BBFS: Reputation is also an important hindrance in electronic auctioning of services. One of the interviewed experts stated that the implementation and utilization of electronic auctioning devices is especially problematic for a facility management full service provider. The argumentation in this case was as follows (translation of the author):

"Especially employees with sales experience have problems with the utilization of electronic auctioning of services. Our sales department strongly opposes that our facility management full services are auctioned electronically. They think that facility management full services cannot be auc-

tioned as the quality of the services is the most important aspect and not the price. If we conduct electronic auctions of services ourselves in order to lower the prices of services from our subcontractors, we cannot argue that our own services should not be auctioned. If we did this, our reputation would suffer severely.”

Hence, the influence of reputational aspects on the utilization of electronic auctioning has been neglected in this study.

A methodological limitation of this paper is that the questions concerning hindrances in electronic auctioning of services were part of a much bigger online questionnaire. Hence, only a few questions were actually dedicated to the mentioned hindrances. In further studies, the influence of reputation on electronic auctioning of services seems worthwhile to explore. And in order to bolster statistical significance and improve eigenvalue and canonic correlation, a questionnaire could be designed which solely tackles the paper's topic as well as the ways to overcome these hindrances.

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I2: ICT and the urban

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ICT use in delivery of uncertain and complex project services: the case of building refurbishment

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Auto repair, industrial maintenance and surgical services share with building refurbishment an uncertainty associated with the condition of the object that is to be serviced. Here, the aim is to study how the use of various types of ICT support for service delivery depends on the ability to determine the state of artefacts subject to intervention. Relying on theories of technology acceptance, a survey of ICT support in refurbishment covers 16 managers. These were found to prefer usefulness to ease-of-use. 3D scanning of existing buildings was unusual, and this limits the application of integrated digital models in co-production with clients. Simultaneously relying on virtual media and face-to-face contacts appears to be important.

1. Introduction

Whereas the relation between providers and customers for many types of consumer services has its focus on service encounters and their balance between face-to-face interaction and various media, there is a group of project based business services with more extensive and recurrent encounters (cf. Gutek et al., 1999; Sundbo et al., 2015). Among the project based business services, there are relations where innovation is less important than joint problem solving. Here there is a range of services, from those with a strong creative element such as advertising to those which are also depending only partially on fixed routines, while nevertheless considered to be less creative, such as building refurbishment. Co-production takes place here starting from a contract which does not specify the service outcome in detail. Instead, discoveries are made during the project and a number of solutions are found successively.

Construction projects in general and building refurbishment in particular are produced by service systems that typically include at least one knowledge-intensive business service firm (e.g., architects, engineering consultants) and at least one firm belonging to operational business services, according to the services classification by Glückler and Hammer (2011). Here it should be noted that the construction industry is not officially classified as part of the services sector in national accounts, although it is easy to argue that building refurbishment is a service activity (Holm, 2000).

Using the classification of services developed by Silvestro et al. (1992), building refurbishment can be characterized according to its equipment/people focus (more equipment than people), customer contact time per transaction (high), degree of customization (high), degree of discretion (high), value added back office/front office

(both) and product/process focus (product). Refurbishment appears to fall mostly in their 'service shop' category, somewhere between professional and mass services. Auto repair, industrial maintenance and surgical services share with building refurbishment an uncertainty associated with the condition of the object that is to be serviced. Therefore, IT use for services that intervene in clients' complex artefacts is twofold: as for most other types of services IT will support more efficient delivery, but there is also a potential for more efficiency in diagnosing the initial condition.

For many types of services, not only mass produced, the trend has been over decades to narrow the gap between routine driven manufacturing processes and service production, partly by breaking down services into modules and introducing more detailed control systems (Sundbo, 1994). This development is slower or difficult to identify for more complex services where delivery is subject to uncertainties and a high degree of unique customer adaptation, such as the majority of building refurbishment projects. It is then probable that project control systems will be incomplete and to be explained within the framework formulated by Modell (1996) for analysing management accounting and control in services. Fundamental in his first proposition is that

the higher the degree of task uncertainty in services: the lower the emphasis top management places on accounting-based and other formal controls; the lower the acceptance and use of accounting information by operating level managers, and the lower the weight assigned to formal controls in relation to informal ones.

Also, his fifth proposition should be particularly relevant for ICT use in construction and refurbishment site operations:

when the delivery of services is geographically constrained, the weight assigned to informal controls in addition to formal ones [...] is enhanced by greater geographical distance of operating level units from the administrative core of the organization.

The aim of the present investigation is to study how the use of various types of ICT support for service delivery depends on the ability to determine the state of artefacts subject to intervention at the client's site. As a case, actual use and attitudes to IT support in monitoring residential and office refurbishment projects are investigated.

This paper is structured so that it begins by reviewing the co-produced business services, media choice, technology acceptance, as well as ICT use in construction firms and in refurbishment projects. Next, the survey methods relied on are discussed followed by the survey results. Finally, we discuss the findings and identify conclusions from the investigation.

2. Literature review

This investigation draws on several bodies of literature. Basically, theories of co-produced business services are relevant. Media choice and technology acceptance have attracted numerous researchers, and only a few aspects can be brought up here. Over the years, there has been research on the introduction and diffusion of

various types of ICT in construction firms, and more recently also specialized studies of ICT use for building refurbishment projects.

2.1. Co-produced business services

Many consulting services are characterized by co-production with the client, incomplete contracts and information stickiness (impeding transfer of information) (Xue and Field, 2008). Contracts can be incomplete in several ways: for creative services, it is counterproductive to specify outcomes in detail; the state of nature, or the state of an existing structure or system may be too costly to investigate in detail before a contract is signed. Technologies that alleviate information transfer are clearly relevant in the co-production context. There is a parallel with employee and user driven service innovation (Sundbo et al., 2015), although it is unknown how the existence of company systems and platforms might inhibit creativity in IT use on lower hierarchical levels in service organizations.

The advantages of new ICT tools appear to depend greatly on service provision contexts, as is obvious from the retrospective view offered by Miles et al. (2014). Ambrose et al. (2008), who included a construction case in their empirical material, emphasized that projects have phases and that media selection shifts through these phases. Their study concentrated on the choice between telephone and e-mail, in addition to face-to-face meetings. Studies of consumer services include varieties of virtual interactions as opposed to face-to-face interactions (Seck and Philippe, 2013). Co-production relations in knowledge-intensive business service projects are often structured with regular face-to-face meetings, formal digital communication although informal communication over a range of media can also be important. Visualization of schedules and designs can support face-to-face meetings, where provider and client may discuss and evaluate alternatives jointly (Baark, 2005). In a services project context where joint problem solving occurs repeatedly, combinations of virtual media and face-to-face encounters can be of particular relevance.

2.2. Media choice

Initially (Daft and Lengel, 1986), media choice theory was related to equivocality and uncertainty reduction, leading to predictions of the contexts for using e-mail versus telephone communications. However, contextual constraints such as urgency, confidentiality, accountability, social interaction and information integrity should not be overlooked when explaining actual media choice (Palvia et al., 2011). Two of these constraints (accountability and social interaction) can be expected to be especially relevant for media choice in refurbishment projects.

2.3. Technology acceptance

While media choice theory concentrates on the ability to communicate messages, technology acceptance is associated with a different conceptual structure. In a pioneer study (Davis, 1989), the determinants of individual-level technology acceptance were reduced to two, perceived usefulness and perceived ease of use.

The information systems literature separates 'perceived usefulness' from 'ease-of-use' (Karahanna and Straub, 1999). Beliefs about systems are thought to lead users to (i) positive attitudes toward systems; (ii) intentions to use systems, and (iii) actual system use. In their empirical study, availability of training and support from an IS (information systems) department has less effect than expected.

In a study of bank employees comparing TAM and the related TPB (theory of planned behaviour) model, Brown et al. (2002) found that staff attitudes to 'mandated technology' might reflect influences of 'keeping one's job', which lies outside standard theories of IT use. When interviewing managers about their ICT use and requirements on ICT tools, it is necessary to consider that they are expressing beliefs. Lewis et al. (2003) analysed beliefs concerning ease of use and perceived usefulness according to individual, social and institutional influences. Institutional influences emanate from top management and corporate systems; social factors include peer pressure in the organization, whereas individual factors include computer self-efficacy and personal innovativeness with technology.

2.4. ICT in construction firms

Earlier studies of the growing use of ICT in construction projects and construction firms have clarified typical applications as well as drivers and constraints for the implementation of new tools. An analysis of the literature on IT applications in the construction industry including articles published between 1992 and 2001 revealed that frequent applications were in the areas of estimating, cost control, document management, planning, resources management, equipment management, quality management, productivity management, risk management, safety management, bidding and contracting, performance evaluation and financial planning (El-Ghandour and Al-Hussein, 2004).

Drivers for IT use among contractors were identified by Mitropoulos and Tatum (2000) as competitive advantage (winning the contract), process problems (costs, project delays), technological capabilities and external demands (from clients, competitors and government agencies). Having one system to facilitate ease of understanding, end-user focus, training and commitment of all project participants was emphasized by Weippert et al. (2003). Stewart et al. (2004) grouped barriers to IT adoption in the industry at three levels: industry level (clients are misinformed and are cost driven and there is poor interoperability between actors), organizational level (limited resources are available to smaller firms) and project level (low technology literacy of project participants). Another Australian study (Peansupap and Walker, 2006) identified ICT implementation constraints at three slightly different levels: personal, organizational and group. At the personal level, there were budget limits for ICT investment, lack of commitment from other project participants, lack of ICT standards and security problems. Organizational constraints were related to computer experience, time for learning, and furthermore the identification of benefits from ICT use. Group level constraints were seen as relating to the time available for information sharing, the quality of personal contacts and the effects of geographical distances.

How ICT supports client-contractor co-production is thus only touched upon in most construction studies. Developing a firm level index for contractor IT use is no less

than 48 work functions, El-Mashaleh et al. (2006) did not reach a significant correlation with customer satisfaction, which they measured only as percentage of repeat business customers; their US questionnaire survey, however, revealed that 81 per cent of respondents agreed (or slightly agreed) that IT had an impact on customer satisfaction in general.

In a longitudinal study, Samuelson and Björk (2014) have tracked IT adoption in the Swedish building sector, relying on surveys carried out between 1998 and 2011. Their results indicate that all sites had computers and Internet access already in 2007. Mobile connectivity had brought significant benefits including Internet access alternatives to temporary work places such as construction sites. Improving communication and sharing information were highlighted as strong drivers for IT use, while use of more complex applications, namely the implementation of building information modelling (BIM) (cf. Azhar, 2011), was found to be unusual. Compared to other firms in the building sector, not least technical consultants, contractors appeared to use electronic document management and BIM less and they generally presented a lower degree of IT maturity. Although contractors were found to increasingly use IT for materials management and purchasing, they do not use more IT for scheduling and cost estimating purposes, again compared to other firms in the sector.

BIM is an example of an advanced interorganizational use of ICT, involving both clients and other participants of construction projects. Adriaanse et al. (2010) developed a theoretical model explaining interorganizational use in US construction, assuming that intention to use lies behind actual use. The intention arises from personal and external motivation, although actual use is also influenced by knowledge and skills as well as acting opportunities. Analysing the adoption of BIM in construction, Singh and Holmström (2015) rely on Maslow's motivational theory of needs to explain adoption of new technologies by actors at both individual and organizational levels. The study highlights the role of organizational change management, primary and secondary needs of individuals and external perturbations. This and other studies of the slow uptake of BIM appear to have underestimated the effect of positive network externalities, in other words that the profitability for a contractor of engaging in integrated models for project communication depends on acceptance of BIM among a sufficiently large number of business partners in the sector.

According to Nourbakhsh et al. (2012), who developed a mobile application prototype, usability is the critical determinant for unsophisticated users who may lack experience with, e.g., touch screens. Their study is based on an analysis of how clients, consultants and contractors need information from each other. For new construction, they identified contractor needs for on-site information management: schedule updates, reporting violations, reporting quality control and assurance problems, accident reporting, productivity information, report inspection results, progress photos and change orders.

In principle, we should expect ICT on construction and refurbishment sites to serve one or more of three purposes: (i) to offer immediate data and information support for carrying out the core production process itself, (ii) to measure performance (or at least for accounting), (iii) to support the customer dialogue. To some extent, these three purposes can be expected to give rise to similar requirements on ICT tools. In

addition, there could be purpose-specific site user requirements that would influence ICT use as far it can be observed in reality.

2.5. Refurbishment projects

Refurbishment is a service that is delivered at the customer's place; ICT is used by the provider service system – at least by design service providers – to translate customer needs (Sundbo et al., 2015), and it is used by refurbishment contractors for internal purposes of monitoring the service project. The role of co-production extends beyond an element of participatory design (Sørensen and Henten, 2014) and can be observed throughout a typical refurbishment project. The usual distinction between service encounters and service relationships is blurred in the case of most building refurbishment projects, as well as in many new construction projects. While repeat business with the same client may be unlikely or only happening after an interval of years or decades, there is a succession of contacts between the service provider (refurbishment contractor) and the client (building owner) during the project, which might last several months. Within the project, there is clearly a service relationship in the sense of having repeated contacts (Gutek et al., 1999).

In this sense, refurbishment is similar to co-production in any construction project and is partly to be interpreted as renegotiation of an original contract. Such changes in contracts may arise from a variety of sources (Bröchner and Badenfelt, 2011). For refurbishment, the successive discoveries of the true nature of the existing structure, which is the client's imperfectly understood artefact, can give rise to multiple adjustments which have to be negotiated. New infrastructure construction projects, in particular tunnels, are often characterized by a related process of successive discoveries of rock properties as tunnelling reveals the state of nature.

Refurbishment includes a number of site activities or processes which are partly tied to company processes. Singh et al. (2014) have listed nine typical site processes:

- (i) preparation of plans and specifications,
- (ii) site investigation by contractor,
- (iii) preparation of site logistics plan,
- (iv) mobilization and demobilization,
- (v) temporary construction,
- (vi) selective demolition,
- (vii) material and equipment procurement,
- (viii) demolition waste management,
- (ix) mechanical, electrical, and plumbing roughins (installation).

Most of these site processes depend on ICT tool use, and for some of the processes, there will be little or no latitude for site staff to deviate from company systems.

Compared to new construction, refurbishment projects suffer from a higher degree of technical risk and uncertainty, making them less predictable (Egbu, 1999).

Decentralization gives refurbishment production managers flexibility and allows quick decisions to respond to the higher risks and uncertainties associated with the refurbishment works. In Egbu's survey of refurbishment organizations in England, financial management of refurbishment projects was more stressed by managers in senior positions, whereas junior (typically production managers) and middle

management were more interested in the planning and programming of the works. Communicative skills were ranked highly throughout the organizations. Skills of decision making, required by the need for impromptu solutions to be found during projects.

Different applications and customization are needed for different groups of employees; two main groups to be distinguished are mobile knowledge workers and mobile field workers. Stieglitz et al. (2015) include real-estate restoration workers in the group of mobile field workers and define the characteristics of mobile field workers as that they deal with simple-structured, recurring, urgent, hands-on and coordinating tasks. Given these characteristics, permanent access to internal corporate information is not identified as a necessity for field workers, and information flow among them focuses more on coordination than collaboration. It is argued that there might be technical problems for field workers such as finding wireless networks. Besides technical issues, Stieglitz et al. (2015) see it as difficult for organizations to adopt mobile applications in daily work routines in the presence of information overload, to convince employees to use the mobile application and also dealing with security concerns. It should be noted that production managers, compared to refurbishment workers, may have to deal with more complex situations and uncertainties while some of their tasks are seldom repeated.

More recently, integrated digital models for the entire life cycle of facilities have been developed and increasingly for new construction of (complex) facilities. Early and late stages of a facility life cycle are of obvious interest to clients, and efficient digital models would serve as a good medium for communication between clients and contractors. Nevertheless, in the context of refurbishment projects, the implementation of building information modelling (BIM) has been more of an exception (Ali, 2010; Cheng and Ma, 2013; Kim and Park, 2013; Volk et al., 2014). Early reports indicate strong positive effects of BIM on labor productivity in subcontractor renovation activities, mostly due to increased reliance on prefabricated components (Poirier et al., 2015).

In principle, BIM for refurbishment can be integrated with geometrical data obtained by 3D laser scanning (Brilakis et al., 2010). Industry experiences reveal that the efforts involved in modelling even simple buildings are costly, because of the manual effort to convert surface data (such as are obtained by 3D laser scanning) into a parametric BIM model. In addition, there is the issue of technical features (such as rotting timber, asbestos and other hazardous substances) hidden from sight, but which might appear in broad daylight as refurbishment proceeds.

Closer to the issue of how ICT supports client-contractor co-production is the use of digital decision support systems for housing condition assessment and refurbishment strategies. Such systems can be seen as useful for residents, providing information about trade-offs between cost and quality including life cycle cost, renovation cost and improved quality and therefore decreasing conflicts between residents and contractors (Juan et al., 2009).

3. Methods

The study is based on a Swedish survey of 16 production managers with experiences of housing and office refurbishment projects as well as experience of working in projects of different sizes. These production managers belong to two of the largest contractors in Sweden. Production managers are site managers, coordinating refurbishment work on site. A questionnaire has been combined with face-to-face semi-structured interviews. The survey covers use of various ICT tools on refurbishment sites, managers' views on ease of ICT tool use, access to support and linkage to life-cycle design (BIM) software, as well as the relation to clients' databases.

4. Results

Questionnaire results concern hardware use by refurbishment project managers (Table 1), as well as their perceived requirements on ICT tools and systems (Table 2). The interview results allow an understanding of how the project managers reason more in detail and an understanding of causal relationships.

4.1. Hardware use

The questionnaire responses indicate that laptops, mobile telephones, printers and scanners are IT tools used commonly on refurbishment sites while tablets are rare (Table 1). The standard deviation for use of tablets is relatively high. Production managers either do not use tablets at all or use them seldom compared to other IT tools.

Hardware	Average	Standard deviation
Laptop	4.9	0.34
Tablet	2.2	1.05
Mobile telephone	5.0	0.25
Printer	5.0	0.25
Scanner	4.8	0.40

Table 1: Hardware use among refurbishment production managers

The interview responses agree with the questionnaire results where use of mobile telephones and laptops was acknowledged by everyone. Only half of the interviewees, however, said that they use tablets and the other half thought that tablets would be used in the future at refurbishment sites. One of the interviewees mentioned their organizational policy where production managers have access to tablets when a project budget exceeds a certain limit. Besides these types of hardware, interviewees also mentioned printers, wireless Internet and scanners. One

of the interviewees pointed out monitor screens on sites, where they share information about the project.

Based on the interview results, different kinds of hardware can be seen to be used for different purposes. Laptops are used for planning, e-mailing, handling invoices, following resources, writing protocols, purchasing, cost management, monitoring of quality, staff management, information searches, networking within the organization, managing drawings, scheduling and safety rounds. Mobile telephones are used for basic purposes as telephoning and messaging, and for more advanced purposes as e-mailing, taking pictures and sharing, scheduling, reading documents, looking at drawing details, safety rounds, reminders, entering project data to the system via an application and checking calendars. Tablets are often used for visualization including checking drawings on the actual site, taking pictures during safety and quality rounds and attaching them to the drawings, environmental rounds and 3D models. One interviewee said: “Well, I believe that we shall have tablets with much more 3D models within a few years”, while another interviewee described the need for tablets on refurbishment sites as:

Pads, on site, just for handling drawings; to avoid having drawings out on the site, you should be able to extract the drawing, scale it up and down and then be able to view and explain to the craftsmen then and there, simply and flexibly. And also for inspections, safety rounds, environmental rounds....

Distributed visualization of documents is important. Another interviewee mentioned that there were a computer and a projector at a higher level of the building undergoing refurbishment:

with a cable going down here so that we are able to run PowerPoint presentations up there where the workers are sitting, if there is any information or [...] or for waste handling, an information sheet, in that case we can just mirror the desktop view from down here. Though we haven't used that yet, but there it is, nevertheless.

4.2. User requirements on ICT tools and systems

Returning to the results of the questionnaire survey, the average and standard deviation of all statements are presented in Table 2. For their mobile phones or tablets, the interviewees identified several functions they would like to have, mainly related to accessibility, including: having a portal where drawings are constantly updated, having tablet software which allows easy linking and comparing reality with a drawing, accessing the security camera monitoring of the construction site via mobile phones and being alerted if anything suspicious is going on, accessing all files at any time, an application that facilitates keeping track of different projects, and accessing information about projects and pictures during meetings. Automatic updates was emphasized by one of the interviewees: “that the drawings are automatically downloaded to a tablet overnight, that is the future, new drawings will be on the portal in daytime, and your tablet will be updated during the night.”

Statement	Average	Standard deviation
It must be easy to enter data to the IT support	4.4	0.49
It must be easy to update project information in the IT support	4.5	0.50
IT support must allow easy connections to the BIM (3D) models	2.6	0.95
IT support must be available without interruption which lasts longer than 30 seconds	3.8	1.24
If I have IT related questions, I must be able to get help within two minutes, even outside normal working hours	2.6	0.88
It must be easy to interpret what I see on my screen	4.4	0.61
IT support must be able to connect to the client system	2.4	0.88
IT support must be available on my smartphone	3.6	1.02
I must be able to reach all the digital drawings quickly	3.8	1.24

Table 2: Site user requirements on ICT tools for refurbishment projects

The interviewees reflected that it is important to be able to use IT tools on the actual construction site. Besides the technical capabilities of providing flexibility to the users, production managers use IT support tools depending on the level of value it creates for the user. It should not take more time to use an IT tool to complete a task compared to the traditional way. Nevertheless, one interviewee gave an example of visualizing time plans which took considerable time to produce and update, but they were very useful. Sources of added value can be different, for instance according to one interviewee, project data were entered directly to a portal by using mobile phones and tablets, and thus they avoided paper use and worked in a more sustainable way. There was also a more dubious example where the organization introduced a new application linking mobile phones and printers so that production managers can print directly. However the interviewed production manager was dissatisfied since he did not understand why such a connection was needed. Clearly, interviewees appreciate if they see a value from the use of IT support tools and that the particular type of IT support possesses useful technical capacities.

5. Discussion and Conclusions

The results showed that production managers assert that they replace or refine traditional methods with IT support tools when they find them useful, although it might take them more time than before. Interpreted in terms of the technology acceptance model, it is the perceived usefulness of an IT support tool that production managers primarily consider rather than ease of use, since they were willing to spend more time on new IT tools than they did traditionally.

While applying a technology acceptance model to production managers, it is crucial to consider organizational hierarchies, routines and policies. This is particularly relevant here, given that all respondents were employees of large organizations. One of the production managers acknowledged that they are mandated to use tablets and BIM models for refurbishment projects over a certain budget. The modelling even of simple existing buildings is costly, but the contractor clearly saw profits of using BIM and 3D modelling for larger projects, making project size one determinant of the level

of IT use. This might explain why BIM use is more often seen in new construction projects rather than in refurbishment, where the typical project budget is lower.

According to Lewis et al. (2003), peer pressure influences IT use among knowledge workers, but this source of external pressures was not acknowledged by the interviewees in the present survey. Instead they would emphasize the usefulness of IT support tools and perceived self-efficacy as influences on adoption. This pattern of attitudes can be explained by the fact that refurbishment organizations are decentralized which gives flexibility to production managers who are empowered to make quick decisions when responding to the higher risks and uncertainties associated with refurbishing buildings (Egbu, 1999). It is also what can be expected along with Modell's (1996) argumentation concerning the effects of task uncertainty in services.

Whereas there are elements of client/contractor co-production in refurbishment projects, the questionnaire survey results showed that production managers failed to see any need for connecting to a client's IT system. Furthermore, none of the production managers acknowledged the importance of clients and co-production during face-to-face interviews. Establishment of BIM models with joint databases can be seen as creating a platform enabling more efficient routines for co-production between contractors and clients. BIM is not used for small refurbishment projects which can be explained by the observation that neither clients nor contractors see profits of using BIM in smaller refurbishment projects. Nevertheless, it is reasonable to expect that developing database that allow easy visualizing of refurbishment projects can make the service relationship with client interaction during formal meetings more efficient. As in the relation between the production manager and the refurbishment workers, it is the simultaneous combination of IT interfaces with face-to-face encounters that is important.

More extensive use of ICT tools, advanced or simple, is associated with the project scale. It is possible to spread the cost of stronger ICT support in large refurbishment projects, reducing technical uncertainties and establishing a platform to enhance co-production with clients.

The reluctance among production managers to engage in integrated IT models of buildings and linking to clients' IT systems can be understood as caused by the difficulty of assessing structural and other problems that are often encountered during refurbishment. Experiments have been made with 3D laser scanning to provide geometrical models that are compatible with BIM, but the IT support possibilities for discovering in advance what is hidden under wall and floor surfaces are still insignificant. This is a major reason why traditional craftsmanship remains important in building refurbishment. Innovative and effective diagnostic methods are necessary for enjoying the benefits of IT model integration, supporting co-production dialogues, while also making it possible to monitor productivity and sustainability effects more closely for ongoing projects.

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I3: Improving customer loyalty and management through

Chair: Jean Philippe

Evolving the online customer experience - Is there a role for online customer support?

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Abstract

This paper explores the online customer experience (OCE) in relation to a utilitarian search for government provided business support services. The aim of this research is to understand the variables that can influence customers searching for business support services online and to explore the potential role of online customer support via social interaction during a customer's online experience. Through the use of in-depth interviews and structural equation modeling, this study establishes a theoretical framework outlining the variables that have the potential to influence the online customer experience within the business support environment. This paper provides further theoretical understanding of the OCE through the introduction of information quality, website credibility and the length of time spent on the website, as variables influencing the OCE. In addition, this paper establishes the need for online customer support during a utilitarian search for business support information and services.

1. Introduction

Recently, services researchers have developed an interest in the online customer experience, most often centred on the online retail environment (Hoffman; Novak, 2009; Luo et al; 2011; Rose et al, 2012). Researchers, marketing practitioners and consultants have long expressed an interest in the customer experience and have agreed on its importance in producing outcomes of satisfaction, revisit intention and trust (Shobeiri et al, 2014). However, empirical research on the online customer experience (OCE) remains scant (Ahmed, 2011; Bigne et al, 2008), thus it is important for both academia and industry to understand how the customer experience can affect the online customer in a number of different searching and buying contexts.

Additionally, online social interaction through the use of web 2.0 functionality and social media has received much attention from marketing researchers as tools that allow customers to collaborate, communicate, share and connect with each other, (Kaplan; Haenlein, 2010; Mayfield, 2008; O'Reilly's, 2005) yet researchers have not explored the role of social interaction (synchronised communication) between customers and customer representatives in providing online customer support in relation to the customer experience. Given the recent technological developments providing online social interaction, this paper advances our understanding of the role of social

interaction in providing online customer support in relation to the customer experience.

Recently, studies have investigated some of the drivers of a positive customer experience. This study steps outwith the online retail shopping environment and explores the customer experience in a utilitarian context of searching for Government provided business support information and services. Government economic development agencies provide business support services on business growth, leadership, developing employees, funding and day-to-day advice on running a business. Large proportions of public money are spent on the development of web services to provide business support, yet little research has explored the variables that may influence a customer's experience interacting with such services. The main objectives of this study are as follows:

- 1) Examine the variables influencing the online customer experience while searching for business support information and services.
- 2) Investigate the role of customer emotions while searching for Government provided business support services online.
- 3) Establish the role of customer support through social interaction in relation to a customer's experience.
- 4) Develop a comprehensive online customer experience model incorporating variables influencing the customer experience during a utilitarian search.

Through exploring these objectives this paper makes several contributions to services literature by adding and extending knowledge through developing and testing a new online customer experience model within a novel context. The paper first of all discusses the theoretical background of searching for information online and the customer experience. In the next section the research method is outlined, followed by the findings of the research. Lastly, a discussion of the findings, theoretical contribution, managerial implications, limitations and suggestions for future research are provided.

2.0 Theoretical Background

2.1 Information search

Within the area of marketing, research to date has somewhat neglected information search. Most research papers have been aiming to understand a customer's overall decision-making process in the context of purchasing a product (Engel et al, 1978). Within Engel et al's (1978) decision-making model, information search is a key part of the decision making process. Thus, it is important that marketers have an understanding of the underlying information search process. Like the customer experience, information search is regarded as a holistic process, involving the psychological constructs of cognition and affect (Kuhlthau, 1991). Kuhlthau (1991) research was the first to outline the role of emotions in searching for information. More recent

research conducted by Flaviano-Blanco et al (2010) found that emotions are prevalent when searching in the online environment prior, during and post search. Kuhlthau's (2004) influential research suggests that if customers do not have positive emotions during search and instead experience emotions of frustration, anxiety and uncertainty, they are likely to abandon their search. As a result researchers have aptly outlined the importance of emotions in the customer experience.

2.2 Customer experience

The customer experience has been extensively discussed in the offline environment (Schmitt, 1999; Edvardsson et al, 2005). Meyer and Schwager's (2007) suggest the customer experience is the "internal and subjective response that customers have to any direct or indirect contact with a company" (Meyer; Schwager, 2007, p.118). The customer experience is often theorised as a psychological construct, which is holistic and the subjective response resulting from touch-points with an organisation (Gentile et al, 2007). The psychological constructs of cognition and affect have been identified in numerous aspects of customer experience (Edvardsson, 2005),

According to Carbone and Haeckel (1994) the outcome of a customer experience is the creation of takeaway impressions that are subsequently stored in the memory of the customer. Numerous research studies have outlined that the customer experience is an important area of research due to the outcomes of a positive customer experience (Meyer; Schwager, 2007), namely satisfaction, trust, re-visit intention, re-purchase intention and loyalty (Schmitt, 1999; Edvardsson, 2005). Verhoef et al (2009) outline that a focus on the customer experience is of the upmost importance to organisations in order to have a competitive advantage, moving beyond that of assessing service quality.

2.3 Online Customer Experience

Empirical research on the online customer experience remains somewhat limited. Customers operating in the online environment encounter numerous components capable of influencing their experience with the website (Rose et al, 2012). Gentile et al (2007) found that customers interoperate different types of information on a website (text, imagery, video and audio) from both a cognitive and affective perspective. Novak et al's (2000) research suggested that customers are only influenced by their cognitive thoughts online. However, subsequent research (Rose et al, 2012; Wang et al, 2012; Verhoef et al, 2009; Ethier et al, 2006) outline emotions as playing a significant role with regard to the customer experience. As a result, in line with the search process (Kuhlthau, 1989), Rose et al (2012, p.309) suggest that the online customer experience is a "psychological state manifested as a subjective response to the website". Therefore, the customer can be seen as engaging in cognitive and affective processing due to the influence of stimulus material and characteristics of a website, which as a result forms an impression in the memory of the customer.

A comprehensive review of the literature outlines 14 variables capable of influencing the online customer experience. These variables include information quality, credibility, flow, telepresence, enjoyment, concentration, engagement, web skills, challenge, interactivity, interactive speed, control (ease of use, customisation, connectedness), website aesthetics and emotions. (See Rose et al, 2012; Hoffman; Novak, 2009; Ding et al, 2009; Mollen; Wilson, 2010; Faiola et al, 2013; Brodie et al, 2013; Mathwick et al, 2005; Macmillan; Hwang, 2002; Song; Zinkhan, 2008; Hilligoss; Rieh, 2008; Van Noort et al, 2012; Wu et al, 2013; Liu; Shrum, 2002; Lee; Jeong, 2010; Harris; Goode, 2010.) While these variables have been outlined individually many have overlapping features and can be deemed as antecedents of variables within various research studies. It is important that this study further explores the relevance of each of these variables.

2.4 Customer Support

However, often regarded as one of the fundamental differences within online and offline service environments is the element of social interaction, i.e. synchronised two-way communication (Nass; Moon, 2000). Within the offline environment, customers interact with service personnel in a face-to-face manner and in some instances may even make an effort to maintain a relationship with key service staff (Macintosh; Lockshin, 1997). In the online environment, the experience is often comprised by the inaccessibility of service staff along with machine responses (Yang; Jun, 2002). Over recent years however, technological advancements through web 2.0 functionality and social media have enabled the development of a more interactive social environment that provides B2B, B2C and C2C communication (Renard, 2013). The introduction of online social functions has developed what we see as the 'social customer' raising the expectation on being able to communicate online (Greenberg, 2010).

Many service providers are now utilising technology in order to provide customer service and support online (Truel et al, 2013). Research has shown that in the offline environment, encounters with other customers and with service staff have an influence on the customers experience during and after the service encounter (Tombs; McColl-Kennedy, 2003). Tombs and McColl-Kennedy's (2003) research finds that social interactions can give rise to individual's emotions and emotional displays, which in turn can influence the individual's behaviour. Truel et al (2013) discuss live chat technology that allows website users to seek 'service related information' from a real human representative who provide answers through the synchronous media (Truel; Connelly, 2013). Additionally, Chattaraman et al (2012) highlight three key purposes of live chat technology, firstly to serve as a search support function, secondly to serve as a basic decision support function and thirdly to serve as a navigational/procedural support function. Such support as highlighted by Tombs and McColl-Kennedy (2003) is often required in the offline environment and subsequently has an effect on the customer's experience. Kuhlthau's (1994) work on the zone of intervention highlighted the importance of social interaction with others in order to move through the search process.

According to Rafaeli's (1988) interactivity theory, a role exists for communication in providing customer support.

3.0 Methodology

The method used in this study is in two parts. First of all in-depth interviews are conducted to explore the research area, followed by an online experiment using Structural Equation Modelling to produce a new online customer experience model.

3.1 Interviews

Due to the limited research within the study's context and the little attention paid to the online customer experience, in-depth interviews were conducted with 16 SMEs from an array of industries (creative industries, financial services, technology and manufacturing) lasting approximately one hour. 94 businesses were approached to take part in the in-depth interviews, of which all had searched for business support information on a Government funded economic development agency's website within the last 30 days. The in-depth interviews helped to provide comprehensiveness and parsimony (Whetten, 1989), therefore deleting those variables that were not relevant to the study. Each interview was recorded using a digital recorder and fully transcribed. The data from the transcripts were colour coded for particular topics and then categorised into relevant themes so that the data can be easily analysed.

3.2 Online Experiment

An online experiment was conducted on three selected Government funded business support websites with a sample size of 160 participants. Three tasks were set up for participants to complete on each website experiment (3x3). Participants were then given a business scenario and information to find, three mini tasks existed within the three main experiments. Participants were given 6 minutes for the tasks on each website, 18 minutes in total, with the experiment and questionnaire taking 36 minutes on average to complete. Figure 1.0 provides a graphical representation of the experiment procedure.

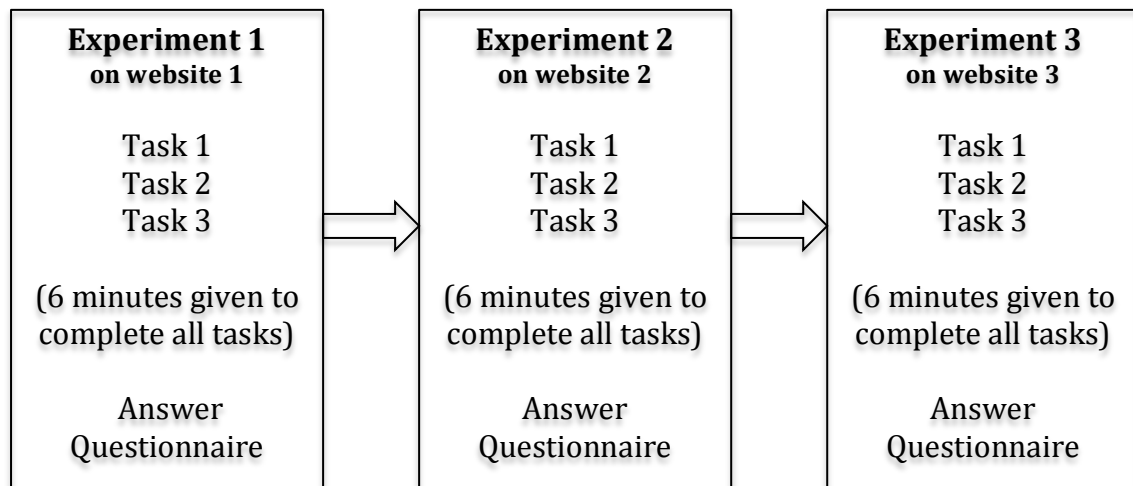


Figure 1.0 Online Experiment Procedure

Using an online experiment provided each respondent with the experience of searching for business support services across three different business support websites. Data were collected through a web-based questionnaire immediately after the completion of each experiment.

In order to test the hypothesised relationships in the study, structural equation modelling (SEM) was adopted using AMOS Graphics 22. Due to the online questionnaires being research administered, all 160 responses were usable with no missing data, which is consistent with the sample required for SEM (Byrne, 2013). The benefit of structural equation modeling is that the hypothesised model can be tested statistically in a simultaneous analysis of the whole model of variables (Byrne, 2013). The sampling frame consisted of a mix of business people, undergraduate and postgraduate business students with the UK. The sample achieved a relatively even split between males (47%) and females (53%). In terms of age group, the study achieved a good representation of ages, 18-25 (37%), 26-34 (28%), 35-42 (18%), 43-50 (14%) and 50+ (4%). On average participants were fairly knowledgeable and relatively confident at using the Internet.

3.3 Measure Development

The questionnaire consisted of 49 scale items measuring the variables outlined from the in-depth interviews. All scale items were measured on a 5-point Likert scale ranging from (1) Strongly Disagree to (5) Strongly Agree. The session length for each task was recorded in order to aid in categorising successful or unsuccessful search. The average time for a successful search was worked out for each task (x3) in each experiment (x3). Those searchers who were faster than the average time to successfully complete the task were allocated 2 points. Those searchers who were slower than the average successful searcher were allocated 1 point and those who did not complete the task were allocated 0 points. In total the maximum number of points a participant could receive was 18 points (3 tasks x 3 experiments). In order to

work within a 5 point scale, like all other scales within the study, the total points for each participant was divided by 3.6. Using the recorded time for completing a successful search allowed the researcher to measure how successful a customer was in searching for their tasks. Additionally, as appropriate existing scales could not be found for the variable 'time spent on the website' a new scale was developed in line with scale development procedures (Churchill, 1979). See appendix 1 for all scale items and their corresponding sources where applicable.

4.0 Results

4.1 In-depth Interviews

This study finds ten attributes that influence the online customer experience some of which can be considered antecedent variables of other higher order variables, thus we are presented with 6 variables capable of influencing the customer experience during an online utilitarian search for business support information; namely, website aesthetics, control, information quality, website credibility, flow and the length of time spent on the website.

- *Website Aesthetics*

Respondents commented on the need for a well designed website that looked aesthetically pleasing and offered a logical layout in turn making navigation simple for the user. The concept of control was found to be an important variable with the potential to influence the customer's experience.

Respondents commented on the need for a site to be easy to use (not challenging), customisable and have the feeling of being able to do what the user requires, thus providing the customer with a level of control over what they are able to do.

- *Control*

The concept of control emerged as an important variable with the potential to influence the customer's experience. Respondents commented on the need for a site to be easy to use, thus providing the user with a level of control over what they are able to do. In addition, respondents outlined the need to be able to identify their own business when searching for support information, as a result being able to receive content that is customised or customisable for businesses may provide the experience required. Respondents pointed out that they want to be able to narrow down their search and find content that is relevant to them. Some respondents explicitly commented that being in control of what they are doing is important to them. Respondents wanted to be able to go to parts of the site that they wanted to see and not have the website dictate what they do. Thus, it is important that control is further explored in the experimental stage of the research and included in the theoretical framework.

- *Information Quality*

The quality of the information provided by a business support site is quite clearly essential to businesses. Respondents commented that key business decisions may be made from the information that is provided to them, as a result it can be expected that the quality of the information needs to be high. While the quality of the information was seen as being important to businesses, respondents further commented on the problem of information overload. Many respondents suggested that the quality of information could be affected by the mass of information that is often provided. Respondents further discussed the time-constraints of searching through such information. Some respondents outlined the need to try and confirm facts through their own knowledge or from other websites. Respondents also discussed the need for information to be accurate in terms of spelling and grammar; such mistakes can leave businesses questioning the professionalism and quality of the information provided by the organisation, as well as the information being current and easily understandable. Respondents aptly highlighted that if the quality of information provided is not good, you simply move on to the next website which is only a click away. Thus, it can be determined that Information Quality is another important variable to explore further in this study and shall be included in the theoretical framework.

- *Website Credibility*

Many respondents commented that the credibility of the website is important to them when conducting a search for business support information. Respondents outlined that in order to evaluate the credibility of the website, respondents look to the surface characteristics of the website such as the look of the site, the brand name, URL, navigation and the ability to contact the organisation. Respondents also commented on the need to confirm the information with information from another source or person within the field. This can be seen as an element of factual accuracy confirmation. Respondents outlined that anyone can simply create a website or a blog offering business support, however, respondents commented that the credibility of that website needs to be brought into consideration. Respondents highlighted the importance of decisions made from the information sought; as a result credibility as well as the information quality appear to be a priority for businesses.

- *Flow*

Further exploration outlined that being able to focus on the customer's task without distraction and becoming absorbed in what the user is doing is an important element in searching for business support information, thus being in the state of flow. However, conversely to other studies, respondents outlined that having a level of enjoyment, which is often seen as a part of flow, is not important to them in the context of searching for business support services, rather being able to focus on the task at hand is seen as more important.

- *Time spent on the website*

The variable of time became very apparent through each individual in-depth interview. Each respondent discussed the issue of time-constraints when searching for business support information. Respondents discussed the importance of being able to find information quickly without wasting any time. Respondents highlighted that they do not have the time to spend 20mins - 1 hour searching for information, the running of the business needs to be taken care of and thus, time can not be wasted. During discussions around other variables that have the potential to influence a customer's experience, the variable of time resonated each conversation. It is clear to see from the findings of the in-depth interviews that businesses are unwilling to spend time searching for business support information. Respondents further commented that any means that can be provided to help them find information in a timely manner is beneficial. Respondents discussed the goal directed nature of their search and therefore highlighted the need to find the information they are looking for and then leave. This for respondents can be seen as the optimum experience.

- *Customer Support*

Respondents illustrated that searching for online business support information is not a day-to-day task and therefore may only be carried out once or even twice per year, thus, respondents suggest that assistance is often required in an unfamiliar environment. Respondents suggested that being able to interact with a company representative, having the ability to talk to someone about their needs and the information they are looking for can help to reduce the level of frustration, anxiety and uncertainty over their information seeking experience. Respondents commented that being able to communicate with someone to seek support provides the experience that they are looking for and somewhat expect.

- *Search Success*

Respondents of the depth interviews illustrated that if they are unable to find the information or services they require they will abandon their search and thus result in an unsuccessful search. Respondents commented that searching online can become a frustrating task. Therefore, should customers encounter negative emotions of frustration, confusion and disappointment, customers will not have a positive experience and will be dissatisfied with their search. Further to this, respondents suggested that if they are required to spend longer than perceived necessary searching for information or services they will likely abandon their search on the website and move to an alternate service provider.

Following the insights from the in-depth interviews, we have reached the conceptual model in figure 2.

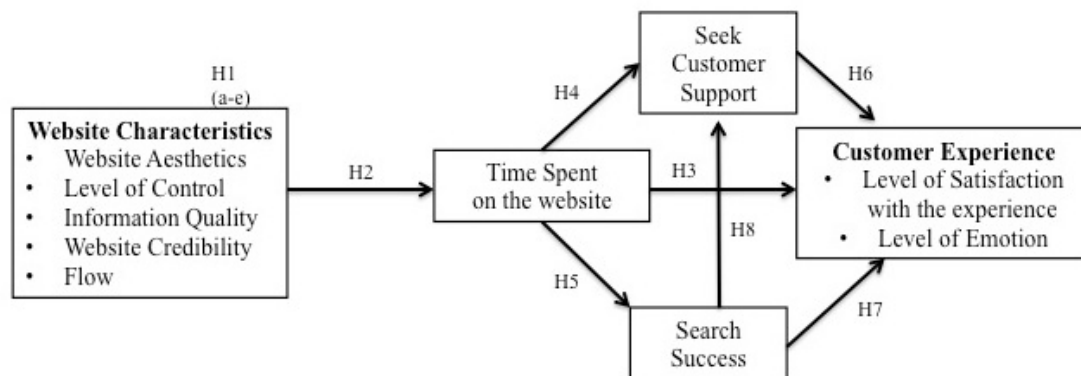


Figure 2: Hypothesised Customer Experience Model

4.2 Preliminary Analysis

Several analyses were performed before going on to estimate the research model using SEM. First of all a repeated measures ANOVA was conducted between business people and postgraduate/undergraduate business students across the three experiments to identify if any differences existed between the responses of the two groups on the variables within the study. The results of this test showed that there was no statistical significant difference between business people and business students, Wilks' Lambda = .40, $f(20.00, 20.00) = 1.514$, $p = .181$. Thus, as a non-significant result was achieved $p > .05$ (.181), it can be concluded that there is no difference in responses to the questions within the questionnaire between business people and business students across all 3 experiments. Therefore, the sample used in the study can be deemed as being appropriate. Additionally, a second repeated measures ANOVA was conducted to identify if any differences existed between the three websites used in the study. The results showed, Wilks' Lambda = .19, $f(20.00, 140.00) = 29.920$, $p = .000$, which can therefore be concluded as a significant statistical difference as the p value is $< .05$. As a result, this provides the study with a broad and representative set of websites that can produce generalisable results for economic development agencies operating business support websites.

Secondly, the study tested for the potential influence of four control variables, age, gender, usage of the Internet and confidence using the Internet. In order to carry out such tests a Multivariate Analysis of Variance (MANOVA) was conducted for each control variable. The results of the MANOVA test showed no significant difference with regard to age group (Wilks' Lambda = .67, $f(40, 596.000) = 1.723$, $p = .069$). In addition, the MANOVA test showed no significant difference with regard to gender (Wilks' Lambda = .937, $f(10, 149) = 1.000$, $p = .447$). Again the result of the third MANOVA test showed no significant difference with regard to how often participants use the Internet (Wilks' Lambda = .76, $f(30, 432.150) = 1.498$, $p = .073$). The last MANOVA test conducted found that there was a significant difference between the level of Internet Confidence a customer has on the variables within the study (Wilks' Lambda = .55, $f(30, 432.150) = 3.404$, $p = .000$). Thus, only one

control variable is included in the structural model (Level of Internet Confidence) as all other control variables produced non-significant results from the MANOVA tests.

Thirdly, scale reliability tests and data normality tests were conducted prior to structural modelling. In order to conduct reliability tests cronbach's alpha coefficient was calculated. The value for each scale was above the critical value of .7 (Pallant, 2013). Thus the scales offer discriminant validity. Appendix 1 outlines the Cronbach's alpha values. In order to determine if the data are normally distributed, a z-score from the skewness and kurtosis values need to be calculated, this is done by dividing the skewness and kurtosis values by their standard error. The z-score for each variable falls between the values of -2.58 and +2.58 after a conservative statistical significance level of .01 is set, therefore the data can be considered as normally distributed.

4.3 Structural Equation Modelling

Structural Equation Modelling (SEM) was adopted in this study with the use of AMOS 22. Structural equation modelling with an analysis of moment structures is one of the most commonly used statistical techniques that is adopted in order to conduct analysis on structural theory through a confirmatory approach (Tabachnick and Fidell, 2007). Structural Equation Modelling involves two important aspects (1) that the casual process that is being studied is represented by a series of structural (regression) equations and (2) the structural relationships can be modelled pictorially to provide a clear representation of the theory being studied.

Structural equation modelling is conducted in two steps, first the measurement model and second the structural model. Therefore in the first step of the structural equation modelling, the CFA measurement model was specified and estimated. The fit statistics of the model were good ($\chi^2 = 2.65$, CFI = .960, NFI = .954, GFI = .949, SRMR = .040, RMSEA = .047, RMR = .015). Further to the fit statistics all loadings were adequate and significant at $p = .000$.

Thus, due to a good fitting measurement model, the study can proceed to the second step, which involves the specification and estimation of the hypothesised structural model as shown in figure 1. The fit statistics of the structural model showed goodness of fit ($\chi^2 = 2.61$, CFI = .973, NFI = .964, GFI = .969, SRMR = .019, RMSEA = .047, RMR = .010), in addition the standardised path coefficient regression weights, R^2 values and statistical significance are shown in table 2 and figure 3.

			Estimate	P
Time Spent on Site	<---	Web Characteristics	-.452	***
Customer Experience	<---	Web Characteristics	.751	***
Seek Customer Support	<---	Web Characteristics	-.453	***
Search Success	<---	Web Characteristics	.582	***

			Estimate	P
Time Spent on Site	<---	Level of Internet Confidence	.294	***
Customer Experience	<---	Time Spent on Site	-.323	***
Seek Customer Support	<---	Time Spent on Site	.528	***
Search Success	<---	Time Spent on Site	-.531	***
Positive Emotion	<---	Customer Experience	.867	***
Level of Satisfaction	<---	Customer Experience	.811	***
Flow	<---	Web Characteristics	.831	***
Credibility	<---	Web Characteristics	.701	***
Info Quality	<---	Web Characteristics	.763	***
Control	<---	Web Characteristics	.913	***
Aesthetics	<---	Web Characteristics	.662	***
Customer Experience	<---	Seek Customer Support	-.614	***
Customer Experience	<---	Search Success	.544	***
Seek Customer Support	<---	Search Success	-.583	***
Search Success	<---	Level of Internet Confidence	-.125	.017

*** ≤ .000

Table 1 Structural Path Regression Weights

	Estimate
Website Characteristics	.260
Time Spent on Site	.291
Customer Experience	.791
Seek Customer Support	.592
Search Success	.629
Aesthetics	.438
Control	.831
Info Quality	.581
Credibility	.479
Flow	.768
Satisfaction	.710
Positive Emotions	.828

Table 2 R² Values

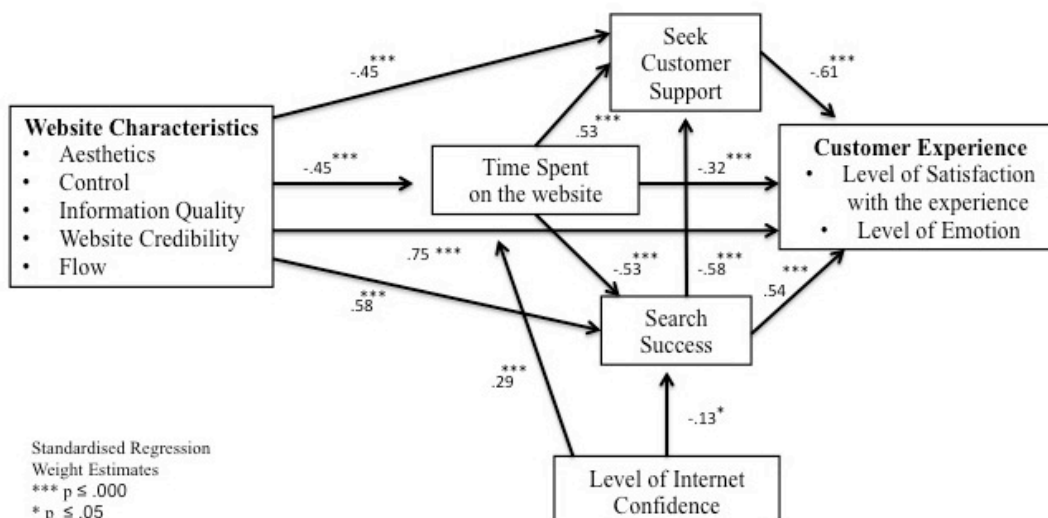


Figure 3 Structural Equation Model

Thus, significant relationships can be seen in table 1 and figure 2 in relation to the hypotheses previously outlined in figure 1. All hypothesised relationships show high regression weights all of which are significant at the .000 value. Therefore, the study concludes that the proposed model with its mediating structure has supporting statistical and theoretical evidence.

5.0 Discussion

The aim of this study was to explore the variables capable of influencing a customer's experience while searching for Government provided business support information and services through developing a new online customer experience model. Additionally, the study aimed to explore the role of customer support through synchronised social interaction online, a phenomenon unexplored in relation to the customer experience. Insights into the findings of the research will now be provided along with a discussion on the theoretical and managerial implications of the research.

5.1 Theoretical contributions

This paper makes a number of theoretical contributions to enhance our understanding of the online customer experience. The first contribution is the introduction of exploring the online customer experience within a utilitarian context of online business support. Past research has explored the customer experience in relation to the online shopping environment (Ha et al, 2010; Khalifa; Liu, 2007; Hoffman; Novak, 2009) and investigating outcomes of repurchase intention (Rose et al, 2012). This paper has provided theoretical insight into a utilitarian search for online information during the customer's journey to finding information.

Secondly, the findings of the research establish that the variables of information quality and website credibility influence the customer experience during a utilitarian search for business support information, both of these variables have been overlooked in previous studies. In addition, this paper finds that an underlying latent variable named 'website characteristics' encompassing website aesthetics, level of control, information quality, website credibility and flow together effect the online customer experience. The findings of the in-depth interviews and the online experiment highlighted the overlapping features of each of the variables. Previous studies (Khalifa; Liu, 2007; Song; Zinkhan, 2008; Hoffman; Novak, 2009; Ha et al, 2010; Rose et al, 2012) have outlined that numerous variables are capable of influencing the customer experience, however this study extends the current body of literature by introducing a new higher order variable and asserting the equal importance of each of these variables together influencing the customer's experience, proving hypothesis H1(a-e). The findings of this research show that the combined variable of 'website characteristics' has a direct and indirect effect on the customer experience through the length of time spent on the

website, requiring to seek customer support and through the success of the search.

This paper has furthered our theoretical understanding of the online customer experience through establishing the unidentified variable of the length of 'time spent on the website' in influencing the customer experience, the need to seek customer support and the success of the search, proving hypothesis H3, H4 and H5. Previous studies exploring the online customer experience have overlooked the variable of the length of time spent on the website. Limited research from Ludin and Cheng (2014) and Luo et al (2010) acknowledge that the length of time spent searching online may be influenced by the quality of the information provided. The findings highlight that the website characteristics (including: website aesthetics, level of control, information quality, website credibility and flow) influence how long customers are willing to spend on the website, poor website characteristics result in customers spending longer searching on the website, proving hypothesis H2. In turn, the longer customers perceive to spend searching for information or services on the website results in customers having a negative experience, resulting in negative emotions and dissatisfaction with the experience. Additionally, the structural model finds that the length of time spent on the website effects the customers likelihood in having a successful search. Thus, the longer customers are required to spend searching on the website the less likely they are to have a successful search.

Due to the emergence of the variable time spent on the website, this paper made a further theoretical contribution through developing and validating a new five point likert scale to measure 'time spent on the website' with four measurement items derived from the in-depth interviews. Following a further review of the literature and due to the fact 'time spent on the website' is a new variable to be introduced to marketing literature, no relevant scale could be obtained to measure the variable. Thus, in line with Churchill's (1979) scale development procedures as previously discussed a new validated scale has been introduced to the literature.

Moreover, this paper outlined the collection of positive customer emotions as well as a level of customer satisfaction as a measure of the customer experience. This is in line with previous studies suggesting that the customer experience is made up of cognitive (Novak et al, 2000; Hoffman; Novak, 2009) and affective (Rose et al, 2012) processes. The results showed high regression weights with statistical significance at .000. Therefore this study further confirms previous studies measures and theoretical underpinning of the online customer experience.

An important objective of this study is to examine the role of social interaction in providing customer support in relation to the online customer experience. This paper found multiple significant relationships with regard to the online customer experience and online customer support. The findings outlined that should customers feel they are spending more time on the website than they feel necessary they will require online customer support through one to one interaction with a company representative. The findings also showed that if

customers perceive the website characteristics (including website aesthetics, level of control, information quality, website credibility and the level of flow) positively then customers will not require online customer support. However, as previously discussed this relationship is mediated by the length of time spent on the website. Therefore while the website characteristics may be perceived positively, the length of time spent searching on the website can result in customers requiring to seek customer support. Conversely, where customers perceive the website characteristics as being poor, customers will require online customer support with a company representative.

In addition, the online experiment identified that customers who have an unsuccessful search require customer support in order to help them find the information or services they require, proving hypothesis H8. Respondents of the online experiment and in-depth interviews suggested that searching for business support information is not a day-to-day task and therefore it can be difficult to find the information required and thus support is often needed. Finally, the structural model illustrates that customers who need to seek customer support do so as they are having a poor experience, with negative emotions of frustration, anxiety and disappointment as well as being dissatisfied with the experience, thus proving the hypothesised relationship of hypothesis H6. The findings illustrated that when customers do not have a level of control over the website, being able to move through the website with ease and customise the website to their own individual needs then they are likely to require customer support in order to find the services they require.

Furthermore, respondents also elaborated on the aesthetics of the website as a fundamental reason for requiring customer support, where a poor design, look and feel of the website gives off the impression that the website may be difficult to use as well as a negative judgement on the credibility of the website. The comments from the respondents further support the rationale of the higher order variable of website characteristics and therefore the reason why each of the variables combining to create 'website characteristics' should be considered together with equal importance. The literature to date has not explored the need for online customer support in the form of synchronised social interaction in relation to the customer experience. This paper specifically establishes this requirement in the context of a utilitarian search for business support information and services. These findings add significant value to research within the domain of the online customer experience.

The findings further elaborate that the success of the search has an effect on the customer's experience. A strong relationship between the search success and the customer experience was found, where if a customer was successful in their search the customer experience would increase by .54 having a significant effect increasing positive emotions and the level of satisfaction with the experience. Therefore it is important to acknowledge the variables of website characteristics encompassing website aesthetics, level of control, information quality, website credibility and flow as well as time spent on the website influencing the success of the search in order for customers to have a positive experience eliciting positive emotions and satisfaction with the experience.

In addition, this paper found that the customer's level of Internet confidence has an effect on the length of time customers are willing to spend on the website. The more confidence the customer has in using the Internet will result in the confident searcher being unwilling to spend longer than they perceive necessary searching for information or services. Thus, confident searchers are even more time sensitive than less confident searchers. Further results showed that the level of confidence a customer has in using the Internet has a relationship with the success of the search. Interestingly, the results find that those who are confident in searching are likely to abandon their search on a business support website. Participants of the in-depth interviews and the online experiment elaborated that using a business support website was not a familiar activity, thus while those participants may be confident in using the Internet in general, the confidence in using a business support website may actually be low in comparison and therefore result in customers having an unsuccessful search. However, based on the psychological reactance theory (Brehm, 1966) where past experiences create expectations, confident searchers appear to become frustrated and disappointed in the website than those less confident searchers, thus confident searchers are quicker to abandon their search and seek customer support than those less confident searchers.

5.2 Managerial Implications

This study offers economic development agencies offering online business support services numerous managerial implications. The findings suggest that the website aesthetics, the level of control the website provides customers, the quality of the information on the website and the websites provision to customers to allow them to concentrate on their task (flow) altogether have an influence on the customer's experience. The website aesthetics refer to the design, look and layout of the website. The level of control refers to how easy the site is to use and the ability to customise the experience by filtering and controlling content relevant to the customer. The quality of the information refers to the accuracy, relevance, how current and the usefulness of information provided on a website. Website credibility refers to the assessment of key surface characteristics of the site, including an assessment of the sources, checking accreditation or company credentials, the brand of the website, the URL and the websites aesthetics. Lastly, flow refers to the extent to which the website allows the customer to concentrate and focus, while feeling absorbed and engrossed in the task. Thus managers and marketing professionals within economic development agencies ought to pay close attention to each of these variables in providing customers with a positive experience.

Much industry research refers to the importance of customers spending a longer length of time on the website as a benchmark of a successful website. This research highlights to marketers and managers of economic development agencies to use such a benchmark with caution as this research finds that the longer customers spend searching on a website, the less likely they are to have a positive experience as well as being less likely in having a

successful search. Thus, marketers should offer business support websites that allow customers to complete their tasks in a timely manner.

As has been previously discussed, a distinctive difference between the online and offline environment is the ability to socially interact with a customer representative. With the advancements of recent technology, new features such as live chat technology and online customer helpdesks allow organisations to offer synchronised customer support online. The research findings suggest that online customer support is required via synchronised social interaction when the website characteristics are poor, the customer is required to spend longer than perceived necessary and when the customer does not have a successful search. Thus, a further implication for marketers and managers of economic development agencies is to provide customers with online support, simply providing customers with information and self-service functions may be a disservice to customers. An introduction of online customer support may help to prevent customers abandoning their search.

5.3 Limitations and recommendations for future research

The findings and the contributions of this study are somewhat constrained by certain limitations, of which opportunities for future research arise. While the online experiment outlined actual behaviour, in order to further explore customer support online via synchronised social interaction, researchers could develop a website with a form of customer support such as a 'live chat' function and one without to compare the difference on the customer's experience. This would help to advance the research undertaken in this study.

Additionally, it would be insightful for economic development agencies to identify if the same variables influence the customer experience on mobile devices. This study conducted the research in the situation of searching on desktop and laptop devices. With the rise of customers using mobile devices to access the Internet for information and services it would be prudent to investigate if differences exist.

Finally, while managerial implications apply for economic development agencies, this research has found that online customer support is required if a customer perceives to spend longer than necessary on the website or if the customer perceives the website characteristics as being poor or if the customer is having an unsuccessful search. It would be valuable for future research studies to explore if a role for online customer support exists within other contexts including the popular online shopping context.

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Unlocking new business potential in the field of digital services

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Abstract

This study explores future digital value creation in service business. The aim is to create understanding about future digital services and business opportunities with the aid of four complementary theoretical approaches: customer experience, reverse use of customer data, different channels (omnichannel) and digital business models. Based on multidimensional theoretical framework of future digital value creation, we suggest empirical research methods and practically-oriented propositions that can be used to capture the specificities of the phenomenon under examination.

1. Introduction

Continuous growth of new mobile devices and digital services has dramatically changed both b2c and b2b customers' behavior in recent years. The most visible change relates to the role of customers in the value creation; the power is shifting from companies to customers (e.g. Vargo; Lusch 2008) and most of the decision-making currently takes place out of vendors' reach in social networks and search engines. Also, the customers' decision-making is more and more guided by emotional and experiential factors, not only rational criteria (e.g. Verhoef et al., 2009). Marketing Science Institute (2014) has suggested that understanding customer and the customer experiences will be the most important research priority in the following years. In understanding customers essential issue is to identify changed behavioral models and value creation processes through which the customers satisfy their needs.

In most industries, majority of the companies have not really understood the consequences of digitalization for customer behavior (Forrester, 2014). In order to succeed in the new digitalization era, the firms need to get to know their customers more carefully and they need to tailor appropriate service packages for each customer type. It

is therefore important to create profound understanding of how digital value creation can be understood and used in developing new service businesses. Our study approaches future digital value creation by focusing on the four key theoretical approaches (i.e. customer experience, reverse use of customer data, omnichannel and digital business models) and a variety of empirical research methods that are able to capture the specificities of the phenomenon. The research questions are: 1) How can digital value creation be understood theoretically? 2) What kind of research methods are needed to create understanding of the future digital value creation within service business? 3) What are the key aspects to focus on in the future when exploring digital value creation?

In relation to the first research question we will explore the possibilities of digitalization with the aid of four complementary theoretical approaches: customer experience (e.g. Verhoef et al. 2009), reverse use of customer data (e.g. Saarijärvi; Grönroos; Kuusela, 2014), omnichannel (e.g. Karjaluoto et al., 2014) and digital business models (e.g. Zott; Amitt; Massa, 2011). They are tools that aid us to understand digital revolution of value creation and to harness its business potential for the benefit of service firms. These approaches have gained scientific attention only recently and linking them to research digital value creation has been scarce. Based on these four interrelated approaches we suggest a multidimensional theoretical framework linking these perspectives together towards understanding on how to unlock new business potential in digital service field. Secondly, this framework of digital value creation aids in identifying the diverse set of research methods that are suitable for exploring this future-oriented phenomenon. Existing research is mostly based on conventional research methods such as case studies (e.g. Yin, 2009) or surveys (e.g. Kahneman et al., 2004) but when the aim is to really understand new digital opportunities in service business in the future, these methods used individually do not provide much help. We will fill this gap by suggesting innovative research methods that can be used to create in-depth understanding of the research phenomenon as well as proposing how different research methods could be combined to provide more comprehensive understanding. Finally, based on the framework we present practically-oriented research propositions that will guide future research towards unravelling new business potential in digital service business.

The theoretical and practical contribution of the study relates to linking four relevant, yet under-researched theoretical approaches together to create comprehensive understanding of how to utilize digital value creation in developing new service businesses. Suggested versatile and innovative research methods will aid forthcoming research to find out ways to better understand digital value creation and related possibilities and challenges. Finally, practically-oriented propositions focus on relevant aspects to be explored in the future and point out several possible pathways to guide both academics and businesses involved in digital service business. Consequently, in the next section a brief discussion on the related literature streams is provided after which the theoretical framework is presented. Then, the methodology of the study is presented and finally we discuss the findings and conclusions of the study.

2. Theoretical background

Customer value creation processes are changing radically. In order to succeed in the turbulent environment, companies must learn to understand and identify differences between their customers more deeply to be able to offer tailored services in accordance with customer needs. In this study we aim to advance knowledge and understanding of digital services in the future with focus on four key approaches: customer experience, reversed data usage, omnichannel strategies, and digital business models. These are next discussed in detail to form a basis for our multidimensional theoretical framework of digital value creation.

2.1. Customer experience

The importance of understanding customer experiences has recently been recognized in academic marketing literature. The concept of customer experience (Verhoef et al., 2009) shifts the focus from the characteristics of products and services towards holistic understanding of value creation and value perceived by different actors (e.g. Komulainen et al., 2006). Verhoef et al. (2009, p. 32) define customer experience as being holistic in nature and involving the customer's cognitive, affective, emotional, social and physical responses to the retailer and suggest that "experience is created not only by those factors that the retailer can control (e.g. service interface, retail atmosphere, assortment, price) but also by factors outside of the retailer's control (e.g. influence of others, purpose of shopping). Pine and Gilmore (1998, p. 98) define a customer experience to occur "when a company intentionally uses the services at the stage, and goods as props, to engage individual customers in a way that creates a memorable event". Although customer experience has been defined as the customer's individual and subjective response and therefore internal, hedonic and extraordinary experience of the individual has been emphasized, the perspective has recently evolved towards a greater emphasis on experience as a collective, co-created phenomenon relevant to both consumers and business actors (Helkkula et al., 2012; Jaakkola; Helkkula; Aarikka-Stenroos 2015).

Each customer experience is a potential source of customer value (Saarijärvi; Kuusela; Rintamäki, 2013) and the creation of superior customer experience is considered key to attaining loyal and satisfied customers (Grewal et al., 2009). The importance of customer experience is in line with the service-dominant logic that emphasizes the experiential nature of value (Vargo; Lusch 2008). Accordingly, value is embedded in the customer experiences created through value co-creation between different actors.

Previous studies suggest that perceived value is not based purely on economic or functional aspects but encompasses both emotional and symbolic dimensions (Rintamäki et al., 2007). Perceived value usually is not rational or objective but very subjective and influenced by time and context (Corsaro; Snehota, 2010). Also past experiences and future expectations are integral parts of value perception (Komulainen; Mainela; Tähtinen, 2013). There are some studies focusing on value of digital

services (e.g. Komulainen, 2010) but in order to develop new digital services with real business potential, more research is needed about holistic customer experience.

2.2. Reverse use of customer data

Traditionally customer data usage – often referred to as customer relationship management (CRM) – supports firm's internal processes, including segmentation, cross-selling, identification of the most profitable customers, supply chain management and rewards for the most loyal or profitable consumers (Payne; Froh 2005). Through the use of this customer data, firms have been able to adapt to fluctuating market demand, understand rising consumption patterns and manage their customer loyalty programs (Saarijärvi et al., 2014). In other words, customer data offer important sources of information that helps firms manage their everyday business activities. Companies' traditional use of customer data can also be useful for customers in an indirect way through, e.g. category management (better fit between customers' needs and the company's product categories) or direct marketing campaigns (customers are provided with targeted promotions of products that they find relevant). However, the current CRM framework has been inherently very firm-centric and focused on using customer data for the benefit of a company (see Thaler, 2011).

The traditional role of customer data is not in tune with the current service because of its inherent focus of selling more products. Increasing number of private and public initiatives challenge conventional CRM activities and suggest new, innovative ways of using customer data by shifting attention towards sharing data with customers rather than using it for firm purposes (Saarijärvi; Karjaluoto; Kuusela, 2013). As the amount of customer data is growing explosively, the customers are becoming more and more aware that firms are collecting data about them. Therefore, firms need to consider how to use the customer data for the benefit of their customers. *Reverse use of customer data* means that firms are converting their customer data into information to directly support customers' value creation (Saarijärvi et al., 2014). This can be seen as the major future development specifically in service oriented business environment.

As suggested by Saarijärvi et al. (2013), moving towards customer data sharing opens up many new business and service opportunities. For example, healthcare actors could return data about customers (i.e. patients) back for customers' own use and local authorities can provide geographical data to customers to modify, refine and apply in their own processes. Also an increasing number of social media applications enables to use customer data to support customers' processes. Therefore, customer data should not be viewed as solely owned or by solely useful for the firm but a way to provide customers with additional resources, for the purpose of better serving those customers. Shifting the focus from internal to external use of customer data finds also theoretical support in recent discussion about service logics (e.g. Grönroos, 2008; Maglio; Spohrer, 2008; Vargo; Lusch, 2004). Accordingly, value is co-created between the actors thus benefitting all the parties involved in exchange.

Understanding the opportunities involved with the reconfigured role of customer data has major implications for practice as it aids in creating new ways to serve customers better which in the long run results in equal benefits for the company. Reverse use of customer data combined with digitalization opens up new ways to support customers' value creation. Most importantly, it enables companies to get involved in their customers' everyday life and thus better responding to their continuously changing needs.

2.3. Omnichannel / Mobile channel

Mobile technology is well on its way to changing both consumer behavior and expectations, and business opportunities for the companies. For example, in the context of retailing, Brynjolfsson, Hu and Rahman (2013) suggest that recent technological advances in mobile computing and augmented reality are blurring the boundaries between traditional and Internet retailing, enabling retailers to interact with consumers through multiple touch points and expose them to a blend of offline and online content. Thus, retailing industry is evolving toward a seamless "omnichannel retailing" which gives consumers more channels from which they can obtain information during the purchase decision process. Decisions can be shaped by information e.g. from the store channel, store websites, mobile apps or social media. This allows consumers to accumulate product knowledge in one channel and then purchase from another channel. As omnichannel enables collecting huge amount of new data from social, mobile and local channels it provides an opportunity for companies to understand not just customer transactions but also customer interactions such as visits to the store, likes on Facebook, searches on websites, and check-ins at nearby establishments (see Brynjolfsson et al., 2013).

Omnichannel is increasingly a part of consumers' and business customers' everyday life. For example, 71% of consumers expect to view in-store inventory online, while 50% expect to buy online and pick up in-store (Forrester, 2014). The greatest change in omnichannel has been the explosive growth of mobile devices (e.g. smart phones, tablets) that has been said to change firms' processes remarkably in next few years (Forrester, 2014). It is clear that today's consumers are focused on convenience, and they expect their retailer of choice to provide this convenience across all channels. However, according to recent market research, only a third of retailers have sufficiently prepared for these changed customer expectations and operationalized even the basics such as store pickup, cross-channel inventory visibility, and store based fulfillment.

Research on service logics (e.g. Grönroos, 2008; Vargo; Lusch, 2008) emphasizes the need to understand customer's everyday life as a starting point for value creation. Digitalization and omnichannel provide new possibilities to develop such services that connect value creation to the customers' routines (Kallio; Lappalainen, 2014). Omnichannel and digital services can be seen as important value creating mechanisms that firms can use to support customers' value creation processes (Karjalainen et al., 2014). Different kinds of mobile services are a significant way to transfer firm's knowledge to serve customer's value creating processes regardless of location or

time. It is critical for the success of the new mobile services to understand the value it creates to all parties involved.

2.4. Digital business model

The concept of business model has been used to describe, understand and model a firm's business (e.g. Chesbrough; Rosenbloom, 2002) and it can be seen as the mode for generating revenues. In other words, it is stressed that the right business model or 'the architecture of revenue' needs to be found if companies wish to create revenues from new technologies (Chesbrough; Rosenbloom, 2002). The business model concept has also been used as a general construct explaining how a firm is interacting with suppliers, customers and partners (Amitt; Zott, 2003). Although there are numerous different definitions for business model concept, it is possible to identify certain similarities between them. First, customer value creation can be seen as one of the core elements: the business model needs to explain how the firm creates value for its customers. Secondly, revenue logic or earnings logic refers to how the firm yields a profit from its operations and the exchanges between different actors. Finally, business model construct also incorporates the relationships that the firm has with various actors in its value network (see Komulainen et al., 2006; Nenonen; Storbacka, 2009).

In developing digital services there is a risk that the firms are investing in service development without clear and defined digital business model. For example, in retailing context digital services are usually seen as a tool to develop customer relationship. Identifying and understanding the digital revenue logic needs to be in the central role when the firms aim to harness the opportunities provided by digitalization.

2.5. Theoretical framework

Based on the above discussion we suggest a multidimensional framework of future digital value creation (see Figure 1). Linking the four theoretical approaches (customer experience, reverse use of customer data, omnichannel and digital business model) together in a model forms a basis for both new practical and theoretical understanding as well as creating scientifically interesting research settings and using innovative future-oriented research methods. In relation to these approaches we identify four involved concepts, i.e. *co-creation*, *engagement*, *customer journey* and *digital service design* as complementing the big picture. They can be seen as tying the four key approaches together and are thus needed to for a comprehensive picture of the influence of digitalization on future value creation in service business.

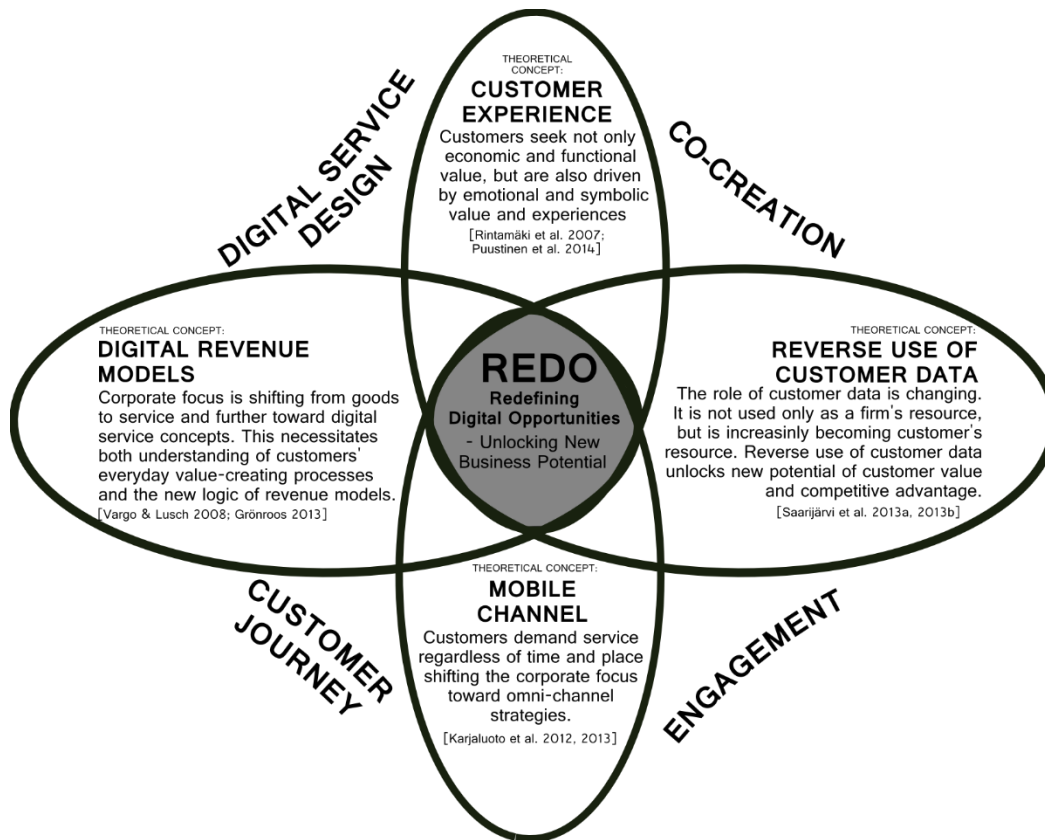


Figure 1. Multidimensional theoretical framework of future digital value creation

Next, we will use the framework as a basis for identifying different types of innovative and future-oriented research methods suitable for in-depth exploration of future opportunities in digital value creation.

3. Methodology

This is a conceptual study that is a part of a larger research project. The objective of the project is to 1) understand how users/consumers/customers create value in mobile context, 2) transform this information to companies and finally 3) identify sources of key competitive advantage rooting from the mobile context and value creation in it. The project involves universities and a research center, as well as industry representatives i.e. companies that strive for better understanding of digitalization in service development. Therefore, it represents a new kind of interaction between digital service providers, technology providers, end users and research institutes. The research project has been ongoing from the beginning of 2015 and it is still in an initial phase. However, we will next discuss the data collection methods that we have either already used or will be using as the project proceeds. In line with Dube and Helkkula (2015) who claim that research should use variety of methods to gain understanding of the influence of individual everyday lives on app use experiences, also this study investigates digitalized value creation using multiple methods.

This research project is divided in four phases (see table 1). The phases are partly overlapping and inter-related. In the first phase, we investigate our partner companies' (i.e. service providers') customers and use multiple data gathering methods for understanding customers' everyday life, and how their value creation processes are and could be connected to companies' businesses. We explore both B2B and B2C customers with the aim of creating a comprehensive understanding of their value creation processes.

In this phase we use many different methods: thematic interviews with partner companies, digitalized storytelling and group discussions conducted in various focus groups, trend analysis, and diary method in parallel with thematic interviews of mobile application users. In addition to qualitative methods also quantitative surveys and web analytics will be used in order to form a comprehensive picture of the customer journeys.

The research project began with altogether 11 initial interviews with research partners (service providers) that were conducted to find out the current state of their service development and expectations for the project. Interview data provides us a starting point for targeting further research efforts towards relevant and interesting directions.

Our focus group working includes both group discussions and digitalized storytelling method. A focus group is according to Thomas et al. (1995) "a technique involving the use of in-depth group interviews in which participants are selected because they are a purposive, although not necessarily representative, sampling of a specific population, this group being 'focused' on a given topic". The main aim of using focus groups is to understand, and explain, the meanings, beliefs and cultures that influence the feelings, attitudes and behaviours of individuals (Rabiee, 2004). Therefore, it is ideally suited for our study as we explore the everyday life of individuals within the context of their experiences. In our study, there were altogether three focus groups with four persons in each group. In addition, three researchers were involved as encouraging discussions and organizing different phases of working. Duration of the focus group working varied from 2 hours to 2,5 hours and all the discussions and material produced were collected and videotaped as well as transcribed afterwards.

During the focus groups the participants discussed about their current use of different mobile services and envisioned their possible lifestyles and behavior in the future in relation to different types of mobile services or applications. In addition to group discussions, a digitalized storytelling method was used to create visions and scenarios about possible future developments. According to Meadows (2003) digital stories are "short, personal, multimedia tales, told from the heart". Anyone can make them and

publish them on screens anywhere. Typically digital stories are personal stories in which sound, pictures and text are combined together to form a small-scale multimedia composition. We decided to use this method as these personal stories may reveal very interesting ideas, thoughts and trends of future behavior and lifestyles of individuals, thus aiding in forming innovative scenarios of how digital services could be used in the future. The analysis of the focus group data has been tentatively started and will be continued with a narrative analysis.

In order to study customer experiences and value perceptions in mobile applications we use a diary method in parallel with thematic interviews in the specific case study of mobile wallet application. The diary research method has emerged as one of the preferred qualitative research methods (see Dube; Helkkula, 2015) and it aims to explore a phenomenon by recording the process elements as they happen (Patterson, 2005). The diary research method provides an in-depth understanding of use experiences in real time, which is not possible by other qualitative methods (Bolger et al., 2003). In the data collected by using a diary method, users of the mobile application were asked to describe and write a diary of their experiences of using the mobile wallet every day during two weeks time period. In addition to the diaries the users are also interviewed to get a comprehensive picture of their experiences and value perceptions. The data collection is still in progress.

From the quantitative angle, we are interested in e.g. continuous use of mobile service. A large survey will be conducted for the users of mobile bank application (i.e. consumers) to find out how their perceived value, engagement with the bank and the continuous use of the application influence their everyday life and the relationship with the bank that is one of our partner companies in the research project.

In the second phase of the project, we will identify *future customers' value creating scenarios* through linking multiple data collected earlier in the first phase. As suggested by Peterson, Cumming and Carpenter (2003) scenario planning is a systemic method for thinking creatively about possible complex and uncertain futures. The central idea is to consider a variety of possible futures that include many of the important uncertainties in the system rather than to focus on the accurate prediction of a single outcome. Scenario planning can incorporate a variety of quantitative and qualitative information and the participation of a diverse group of people in a systemic process of collecting, discussing, and analyzing scenarios builds shared understanding. The scenarios created in this research project enable us to communicate and discuss identified value creating elements with technology providers such as start-ups and SMEs.

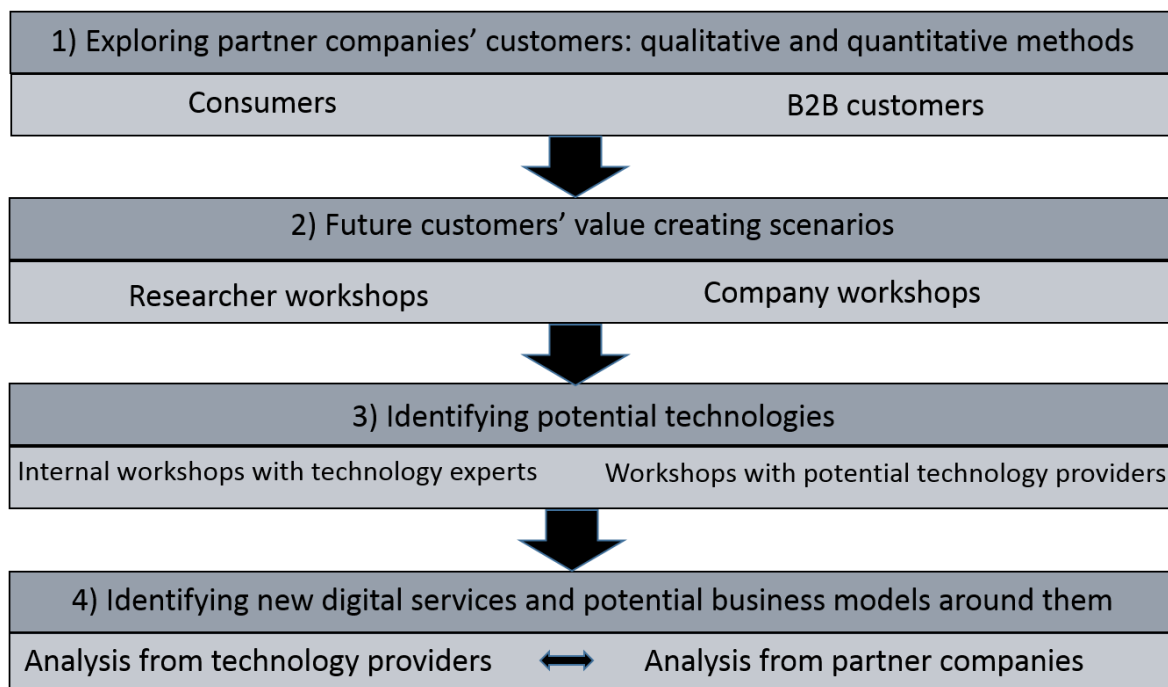
In the third phase the focus is on *identifying potential technologies to support digital value creation*. Following the scenarios identified in the previous stage, needed technologies supporting customer's value creating processes will be suggested. In this phase, thought leaders within the digitalized business will be interviewed and their expertise will be utilized. Thought leaders in this study refer to informed opinion lea-

ders in their field of expertise. They are trusted sources who move and inspire people with innovative ideas; turn ideas into reality, and know and show how to replicate their success (Brousseau, 2014). Klavans & Boyack (2008) suggest that thought leaders have two characteristics. First, they are committed to participating at the forefront of science rather than on older science. Second, they are willing to shift their emphasis from older ideas to newer ideas when warranted. In this research, thought leaders provide us important information and ideas on how to develop new, innovative digital services that create value for both the technology companies, service providers and end users.

Furthermore, we will arrange workshops for company representatives and selected technology providers interested in customer oriented innovation work. Within these workshops, using for example service design methods, participants are encouraged to innovate new digitalized services based on identified customer needs and their everyday life processes. The aim is to facilitate co-created value creation between workshop participants. This also enables us to observe and interview the participants during workshops.

In the last phase, *new digitalized services and the potential business models around them* will be investigated. Here interaction between technology providers and technology users (service providers) is in the focus. In this phase, we will explore and identify possible new digital services and the development of digitalized revenue and business models within partner companies by using qualitative methods, e.g. interviews and observations.

Table 1. Phases of the research project



4. Findings and discussion

Although still in its early phases, this research makes valuable insights both into the theory and practice. It contributes to existing research by linking together the four under-researched theoretical approaches on digital value creation and presents a theoretical framework that aids in understanding and developing new digital opportunities in service business. The concepts of customer experience, reverse use of customer data, omnichannel and digital business models are connected to each other by related concepts of co-creation, engagement, customer journey and digital service design. Altogether they form a comprehensive picture of digital value creation and aid in creating new research settings and identifying innovative research methods for developing future-oriented services.

Secondly, based on the framework we suggest a diverse set of research methods to explore digital value creation. More specifically, we identify different qualitative and quantitative methods that can be used to examine future possibilities and challenges in the field of digital services. These methods aim at in-depth understanding and utilization of customer experiences, reverse use of customer data, use of omnichannel and digital business models as a basis for developing new kinds of digital services. The identified methods include e.g. focus group discussions, digitalized storytelling, thematic interviews, observations, trend analysis, diary method, surveys and web analytics. We suggest that these methods are most useful when used innovatively in novel ways and if possible, as complementing each other.

Finally, based on the above discussion, we present four overall themes and related nine practically-oriented research propositions that will guide future research towards unlocking new business potential in digital services. We hence suggest that the forthcoming research (including this research project) needs to focus on the following themes and related questions:

1. Customer experience and future digital customer journey

P1a: How is customer experience formed in diverse B2C service contexts?

P1b: To what kinds of customer value creation processes will firm's business be connected in the future?

2. Reverse use of customer data and customer value formation enabled by new technologies

P2a: How could digital services be used to transfer firms' knowledge to support customers' processes?

P2b: How is customer value formed now and in the future?

3. Omnichannel / Mobile channel

P3a: What kinds of services will future technologies make possible to create?

P3b: What kinds of technological possibilities are already available to support customers' everyday life?

4. Digital business/revenue model

P4a: How can digital services create value for firms and their customers?

P4b: What kind of business models will be developed as a result of digital value creation?

P4c: What kind of digital earnings logics will be developed around new services?

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I4: Unlocking new potentials of ICT

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XXV. International RESER Conference: Use of equipment lifecycle data in industrial services

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Manufacturing firms can use equipment lifecycle data to enable industrial services. With the increased centrality of information technology, they may need cooperation with software providers, and this cooperation is still poorly understood. This study pursues increased understanding on the use of equipment lifecycle data in industrial services. An exploratory study with four software providers and two manufacturing firms reveals unexploited opportunities for industrial services through intensified triadic cooperation and clarifies the task division between manufacturing firms and software providers. A framework is suggested, on the conditions enabling and promoting success in the services based on equipment lifecycle data.

1. Introduction

1.1. Background

As the competition increases, manufacturing firms need to find ways to stay in business and differentiate from other players in the industry. These firms often need to seek for competitive advantage by extending their offering to services, besides the delivery of industrial goods (Gebauer, 2007). Services can involve the customers as co-producers of added value and quality (Edvardsson & Olsson, 1996) while the supplier gets a better understanding of its customer and is capable of turning that value into revenues. This demands more flexible responses to changing business and the collection and analysis of lifecycle data from the equipment in the customers' use. Software-based services and modern technologies have enabled manufacturing firms to transform from data-driven to more cooperative knowledge-driven environments, by analyzing data gathered throughout the whole lifecycle of their products (Camarinha-Matos et al., 2009).

During servitization, manufacturing firms often take over some of the customer's processes, e.g., through remote access handling inventory and spare parts (Mezgár & Rauschecker, 2014). As the equipment's lifecycle data becomes available, the possibility to offer new services based on use patterns and better customer's understanding becomes real (Yang et al., 2009). Processing the lifecycle data requires specialized skills that servitizing manufacturing firms do not necessarily possess. Consequently, manufacturing firms can use their knowledge of the customers' needs to integrate other service suppliers into their processes (Finne & Holmström, 2013). In spite of the advantages of exploiting this possibility, the use of lifecycle data is challenged by various issues in inter-organizational cooperation, such as agility, security, privacy and interoperability aspects (Mezgár & Rauschecker, 2014).

The literature has already addressed the technical capabilities and challenges of data collection of remote monitoring systems. Westergren and Holmström (2012) presented applications of sensor-based solutions in a real industrial case and mentioned different value drivers for the stakeholders in a network. Their study focuses on the open innovation paradigm and establishes the importance of ICT (Information and Communication Technology) and trust to overcome security issues. It does not focus on the positions and tasks of each player of the network nor provide more details about how to utilize the collected remote data. Technical literature regarding the resources needed to ensure data security and privacy is also available as in Mezgár & Rauschecker (2014), but it has not been broadly studied from a business perspective. Similarly in the technical stand point, Vezzetti (2009) presented Web3D software tools to visualize lifecycle data as part of a Product Lifecycle Management (PLM) initiative. These software tools can benefit network partners with integration and interoperability issues but details about the tasks and business opportunities for industrial suppliers are not explained. Based on these studies and other recent empirical research, it was found that the collaboration between manufacturers and software providers to offer new industrial services has not been studied as much as the more traditional cooperation between supplier and customer in value co-creation.

Particularly, this study is focused on exploring the possibilities of industrial services based on equipment lifecycle data (ELD) and ways of cooperation between the manufacturer and software-based service provider in enabling industrial services. For this study, issues such as security and privacy have raised interest amongst the target companies, therefore the expectations on how to overcome these initial challenges will be addressed. Our contribution is based on offering a combination of two different points of view towards the use of equipment lifecycle data. By combining the perspective of the manufacturing firms and the software-based service providers new business models can be developed based on a triadic cooperation between suppliers of complex systems, software firms and their customers.

1.2. Research objectives

The objective of this study is increased understanding on the use of equipment lifecycle data in industrial services. We explore the use of equipment lifecycle data particularly through supplier's different network positions, tasks and cooperation in the context of manufacturing firms and their prospective software service providers. We also explore the ways in which the companies can enhance the use of equipment lifecycle data, to promote success in their industrial services. We believe the software service providers can design new business models in cooperation with manufacturing firms to deliver the ultimate customer value and at the same time manage the possible risks. To fulfill the objectives, two main research questions are stated:

1. What is the task division between companies (particularly manufacturing firms and software providers) when using equipment lifecycle data in service delivery?
2. How do companies in the network enable and promote the use of equipment lifecycle data for successful service delivery?

The combination of equipment lifecycle data collection and software-based services provides a possibility to improve the service offering of manufacturing companies. In

this study, we explore the perspectives of both manufacturing firms and software firms in the context of industrial services offered for corporate customers. The focus is on industrial equipment, i.e., complex systems, and related industrial services. Consumer services are not covered, and also other parts of the supply chain are excluded. This study does not cover the customer's point of view as we did not have access to them directly. The long lifespan of the equipment is characteristic to the manufacturing firms: as the purchases of the manufacturing firm's equipment are scattered in time, the relation with their customers is almost transactional and in most cases dealt via distributors around the globe.

As a result of this study, we report conclusions on the task division between manufacturing firms and software providers in their triadic relationship with customers, emphasizing the enhanced use of equipment lifecycle data in industrial services. We will report key challenges in the use of equipment lifecycle data, and respective enablers and promoters that can drive forthcoming success in industrial services based on ELD use.

2. Literature review

2.1. Supplier's use of equipment lifecycle data

Manufacturing firms are looking for possibilities to enable more business opportunities by offering product-related services (Gebauer, 2007). Sandin (2015) expressed the importance for the customer and supplier to know the basics of each other's businesses to co-create value supported by various networks. In a traditional approach of product-related services, the offering is limited to the lifecycle of the physical product (Oliva & Kallenberg, 2003). The lifecycle of industrial equipment creates big amounts of data that can be of value for both the supplier and the customer or end user. Equipment lifecycle data refers to the data that can be collected through all the lifecycle phases of an intelligent product, from the market requirements to the disposal or decommissioning (Qureshi et al., 2014). Previous literature discusses the concept of "product lifecycle data", but the word equipment has been selected to emphasize the industrial context in this particular study, and to create a clear distinction from the business-to-consumer market.

Traditionally there are three phases in the lifecycle of industrial equipment: design, manufacturing and service or operational phases (Brunssman et al., 2011). Modern technologies based on ICT have enabled automatic data collection from these different phases in intelligent products. Especially when companies collaborate with suppliers or partners, data management practices increase their relevance (Kropsu-Vehkaperä et al., 2009). Nevertheless, despite the increasing possibilities enabled by remote monitoring systems and the Internet, data collection from the supplier's point of view often ends once the equipment leaves the factory and is delivered to the end customer.

According to Yang et al. (2009), the intelligent product's data can be classified into static and dynamic, depending on the stage of the lifecycle it is collected. The static data is related to the specifications of the product and is collected from the first stages of its lifecycle. These data can include the specifications of the product such as

the materials, components, suppliers and how it operates, and it is often studied under the concept of product data management (PDM). On the other hand, the dynamic data is created during the operational phase of the product and is studied as product lifecycle management (PLM). (Yang et al., 2009; Kropsu-Vehkaperä et al., 2009)

Previous research has frequently looked into the customer's (i.e. equipment users) viewpoint regarding how equipment lifecycle data is used, and the benefits for the manufacturer are often overlooked. Generally, identifying bottlenecks in the operations as well as analyzing possible break downs to minimize negative cost impact are mentioned as benefits for the customers (Brunssman et al., 2011). Most of the benefits of the equipment lifecycle data are connected to the customer's satisfaction and supporting them by taking over some of their operations. Manufacturing firms as suppliers could also benefit from the equipment lifecycle data by forecasting better spare parts stock needed to fulfill customer's demand and decrease warehouse costs. R&D processes can be also improved by knowing exactly how the equipment is being used (Kucza & Gebauer, 2011; Yang et al., 2009). It is necessary for the manufacturers to offer attractive industrial services to get access to the data in the first place. The possibilities are presented in the following section.

2.2. Industrial services based on equipment lifecycle data

The manufacturing firms' interest is to utilize the equipment data to identify service opportunities, and develop and deliver appropriate industrial services in line with the customers' needs (Edvardsson & Olsson, 1996). The previous literature makes evident that just collecting the data is not sufficient to offer more services, but it is necessary to analyze and store it too. Unfortunately the collection of equipment data is not easy in practice and the challenges related to ownership, maintenance and relevant processes have not been widely studied as the academic research areas of PDM and PLM are relatively new (Kropsu-Vehkaperä et al., 2009).

Manufacturing firms utilize different kinds of software tools to handle internal information such as ERP systems (Enterprise Resource Planning), CRM systems (Customer Relationship Management) and supply chain management information systems. These systems can facilitate tasks related to resource optimization, marketing and supply chain management, but there are processes linked to R&D, product provision and support services that are not solved with them (Yang et al., 2007). PLM (Product Lifecycle Management) systems have emerged as a solution to manage the equipment lifecycle data generated during the distribution, use, maintenance and end-of-life stages. Yang et al. (2007) presented a PLM model where the dynamic data flows from the intelligent product to the PLM system through a communication's support infrastructure; after it has been manipulated and stored, the knowledge and information is used to enable industrial services for the stakeholders.

Yang et al. (2009) also proposed a series of services that manufacturing companies can provide to their customers based on the processed data, such as remote management of spare parts, preventive maintenance, as well as modernization services at the end of life of the equipment. Similarly, internal processes - based on dynamic data related to equipment usage and distribution - are possible, such as remote diagnosis and monitoring. Deeper knowledge about use patterns can give the supplier a better understanding of the customers' needs to develop the equipment (Yang et al., 2009).

By relying on external software tools, Kucza and Gebauer (2011) proposed a classification of services in different sorts of operations based on the level of knowledge intensity gained through the data collection. Those operations can be divided in four: customer service, basic services for the installed based, maintenance services and R&D oriented services (Kucza & Gebauer, 2011). This classification is shown in Figure 1.

1st level	<ul style="list-style-type: none"> ▪ Electronic order placement ▪ Spare part forecasting.
2nd level	<ul style="list-style-type: none"> ▪ Cost-benefit analysis ▪ Benefit visualization ▪ Preventive maintenance services ▪ Product and software upgrades ▪ Viability studies/problem analysis
3rd level	<ul style="list-style-type: none"> ▪ Full preventive maintenance and spare parts handling. ▪ Process-optimization through continuous maintenance. ▪ Technical consulting and advice. ▪ R&D support ▪ Process-oriented design ▪ Business consulting in product and process development.

Figure 1: Software-based services based on knowledge intensity, adapted from Kucza & Gebauer (2011).

In the first level, customer services are addressed by providing basic software-based services that include electronic communication. In the second level of knowledge intensity the services are more oriented to provide extra value for the installed base and also some general customer services. The higher level of knowledge intensity deals with all the kinds of service operations, including maintenance and R&D oriented services. This level of intensity implies a stronger relation between the manufacturer and the end customer. (Kucza & Gebauer, 2011)

The software systems used in industrial service delivery such as PLM systems require not only the technical competences, but also an understanding of what data can be generated and how it can be enriched. By sharing knowledge, resources and experiences, firms in a collaborative network could complement their core capabilities (Camarinha-Matos et al., 2009) and fulfill the technical competences and the potential of the generated data. The following section explains the roles that each stakeholder has when handling the data generated by the equipment in a B2B context.

2.3. Companies' network position and tasks in industrial service delivery

Information and communication technologies may drive changes in the stakeholder configurations of industrial service delivery. Previous studies have focused on the dyadic cooperation between supplier and end user (Finne & Holmström, 2013), and their diverse supply-chain collaboration strategies. In some cases, suppliers adopt the role of value process organizers to support unexperienced customers and they go through all the processes of identifying, activating, collecting and integrating resources to make the value creation possible (Sandin, 2015). On the other hand,

manufacturing firms may also work as systems integrators since they have the best understanding of the service needs of their customers, while subsystem suppliers possess the resources and capabilities to fulfill those needs (Finne & Holmström, 2013). This last example fits the scenario we are studying, as a software-based service supplier can fulfill the service needs from the customers of a manufacturing firm. In any case, when a cooperative network exists and combines experience and knowledge from different industries, value co-creation during servitization is possible.

In a more traditional view, value was created with minimal interaction with the customers, but nowadays it is possible to integrate the customers in any step of the value creation process (Mejtoft, 2011). Despite this evolution, the interaction with customers and a support service supplier has not yet been widely considered. The triadic collaboration between software firm–manufacturing firm–customer can be facilitated by different technologies such as wireless communication and analytical software tools. The use of external software tools is already considered in previous literature and the possibilities of remote monitoring of data collection have been analyzed. Nevertheless, there is not a clear path towards acquiring, developing and implementing this kind of tools. It was also noted that the focus has not included data ownership issues neither other clear benefits for the supplier besides increasing revenue through adding customer value. A few studies have covered the network positions, tasks and cooperation of the firms in the service supply chain as summarized in Table 1.

Table 1. *Summary of previous research on manufacturing firms' and software firms' network position in industrial service delivery.*

Author(s)	Sandin (2015)	Kucza & Gebauer (2011)	Finne & Holmström (2013)
Methodology	Multi-case study	Multi-case study	Single case study
Studied network position	Customer-Manufacturing	Manufacturing	Subsystem supplier-Manufacturing
Industry	Aviation	Manufacturing companies	High-tech manufacturing company
Key findings	Partnership is highly valued but monetary benefits are hard to measure. The cooperation co-creates value and suggestions are highly appreciated by customers.	Service organization should be in line with the market. Separating product and service business	Manufacturing firm acts as an integrator, controlling the customer base and knowing their products. The subsystem supplier possesses know-how and resources to service the products. By bringing different capabilities together, servitization is possible.

The tasks associated to the network positions of manufacturing and software firms in industrial service delivery and their cooperation with each other and customers have been studied in separate contexts. Mezgár and Rauschecker (2014) covered the concept of a networked enterprise in manufacturing industry, but specifics on the partners involved in the network were not presented as the study had more of a technical focus looking to the benefits of cloud computing. The position of manufacturing firms pursuing service development has been analyzed jointly with that of their customers, as the needs and requirements are established. For example Sandin (2015) talks about the role of manufacturing firms and their customers in the aviation industry, where the services are built upon products already in use. Kucza and Gebauer (2011) studied in a multi-case setting the service organization and the implications of separating it from the strategy organization within the manufacturing firm, which helped them understand how to respond to the customer's needs in a global setup.

Yang et al. (2009) and Vezzetti (2009) focused on the software capabilities and tools needed to analyze lifecycle data in a manufacturing context, but as such the role of the software tool provider is not presented. The most evident gap in previous research is in evaluating and understanding the role of a software service provider in the network of industrial services. The closest study to address this study's concerns is that of Finne & Holmström (2013), as the triadic relation in the service supply chain is considered in a case study, which showed how a subsystem supplier can provide services to the end user controlled by the integrator. This particular case could be applied in the context of a manufacturing firm being an integrator between the end customer and a software service provider.

A comprehensive study of the network, considering a software service provider as a subsystem supplier to enable services utilizing ICT to process equipment lifecycle data in a manufacturing context is missing. As the wider network is not yet considered thoroughly, the network positions, tasks and cooperation of the different stakeholders are not clear. The service possibilities enabled by equipment lifecycle data have been considered in previous literature but the expectations from the manufacturing firms' point of view are not evident; neither has been the actual added value from software-based services provider. This study will try to answer the research questions by filling the gaps left in the existing literature.

3. Research methodology

3.1. Research design

A qualitative interpretive study was conducted to understand the processes, possibilities, concerns and limitations of the use of lifecycle data in industrial services. As part of a broader study, we gained access to four companies offering software-based services and two manufacturing firms, all with an interest to get involved in data-oriented industrial services. The names and specific information about the companies is kept confidential to protect their privacy, therefore they are referred to as Company A-F.

The software companies to which we gained access varied in size and types of offers, allowing us to identify the opportunities and challenges of their participation in

a collaborative network according to their situation. Company A offers a broad range of products and services in a multinational context, serving small to big customers all over the world. Company B and D are medium size companies offering software solutions and services based on their own technologies, but also acquiring support technologies from other providers. Company E on the other hand offers a solution based on the technology of a secondary source but adds value by offering intensive consultancy services. The first three companies mentioned are used to work in partnerships with their customers and the latter one tends to work in a more transactional way.

Companies C and F in this study are big manufacturing firms with an international presence, delivering high-tech equipment and support services to offer innovative solutions to their customers. Both have developed and adapted technologies to acquire data from their equipment and are currently looking for business cases to develop new services for their customers. The participation of Company C is linked to a very particular business unit with a standardized piece of equipment, characterized by having a long life span and being idle most of the operational time, acting as a protection in case of anomalies in the system it is part of. The focus in Company F is on a product that enables manufacturing automation and allows online and offline data collection, depending on the customers' policies. Unlike Company C's case, Company F's product is constantly used and the products can be tailored to the customers' needs via the embedded software.

3.2. Data collection and analysis

The method for data collection utilized in this study consisted primarily of semi-structured interviews with manager level personnel in the software and manufacturing firms. There were two different outlines for the interviews to better fit the industry's context, although they covered the same topics. Depending on the respondent's background and information the questions had to be adapted and differed to some extent from session to session. Altogether seventeen semi-structured interviews were held with the companies' personnel, exploring their experiences with industrial services, the use of lifecycle data, experiences with software-based services, and cooperation with different stakeholders. A brief summary of the sources of the data collection is presented in Table 2.

Table 2. Summary of data collection sources.

Company	Industry	Interviews	Respondents	Average duration
Company A	Software	4	4	39 min
Company B	Software	1	1	34 min
Company C	Manufacturing	8	8	37 min
Company D	Software	1	1	68 min
Company E	Software	1	1	68 min
Company F	Manufacturing	2	2	33 min

The interviews took place in the companies' offices, allowing the interviewer to also observe the manufacturing firm's products and get a better understanding of how they function and their characteristics. Each one of the interviews had one interviewee per session, them being personnel from different areas such as: product devel-

opment, research and development, sales, lifecycle costs and risk assessment specialists, service developers and business analysts. Since the respondents held managerial positions they were able to provide deep insight about different operations and expectations in each of their departments related to the interests of this study. The current situation was assessed, as well as the expectations and plans for the future regarding services based on equipment lifecycle data.

More specifically, the answers provided by the manufacturing firms came from general area managers to line managers. Product and project managers answered the questions from both service and product's points of view. The focus of the personnel was on servitization, R&D and also software tools and development, despite the fact that the companies were considered as manufacturing firms for the purposes of this study. On the other hand, in the software firms there was a relatively smaller sample compared to the respondents in the manufacturing firms due to the size of the companies. The interviewees held positions related to Internet of Things or Industrial Internet, business analytics, consulting and business solutions. All were somehow related to data analytics and servitization.

The interviews were audio recorded and sent to an external service provider to be transcribed. The first author, who was also the interviewer, revised the transcriptions and compared them to the notes made in each session. After the review, the concepts that were mistaken or misunderstood by the external transcriber were corrected and the gaps left in the transcriptions were filled in. The data were content analyzed in an inductive manner, with focus on three main themes: services based on equipment lifecycle data (ELD), manufacturers' and software providers' network position, tasks and cooperation, and the challenges in implement ELD use in industrial services. To draw conclusions from the analysis, the general tendencies and key differences among respondents will be reported, some illustrative excerpts from the interviews will be used, and the manufacturing firms' and software firms' viewpoints are compared with each other.

4. Results

The interviews revealed versatile current and potential industrial services, rather clear task expectations in the service triad, and key challenges to be overcome in the use of equipment lifecycle data. Slight differences are found between the experiences of interviewees in the manufacturing firms and software providers. The results are presented thematically rather than case specifically.

4.1. Services based on Equipment Lifecycle Data

Most of the service expectations based on ELD from the manufacturing firms are connected to preventive maintenance, which was a recurrent topic in the majority of the interviews. One of the benefits for the manufacturing firms can be the cost reduction when maintenance is planned based on the collected data and failures can be prevented, as they would not need to send a technician to analyze what is the situation but instead could get that information remotely. On the customer side, they could reduce breakdown costs and time if they could know when a component or piece of

equipment is more likely to fail and act accordingly. As said by one of the managers in Company C:

“Now we more or less give just an error message and contact the customer support or the service organization, and then there’s a man or woman travelling to the site and fixing the problem and then travelling back... more self-service oriented information could be implemented.”

The interviewees in Company C and F thought it would bring more benefits to everyone if the services were more proactive instead to reactive. Enabling ELD sharing could benefit both the customers and the suppliers in terms of time and costs allocated to support services. Similarly services related to changes on the configuration or components of the equipment could be enabled too. For example, tracking changes in the lifecycle of the equipment could benefit not only the support and maintenance, but also the update of its components and future service offerings based on the latest status.

Offering reports based on the usage and events related to the equipment was also pointed out, i.e. a potential service could be the analysis of the events to inform the condition of the installation. It could also be possible to know the status of the installed base, for instance reporting what kind of products are in use, their health and possibly also foresee when will be the decommissioning time of a device. By allowing the harmonization of the customer’s installed base of equipment based on the needs understood with the actual equipment data, it would be possible to sell the newest upgrades for the equipment and to keep the customer’s installed base up to date, possibly reducing future maintenance costs and operation issues between equipment in the same system.

Interviewees in the software firms had further experiences based on earlier cooperation with manufacturing companies and they gave examples of services that could be enabled by data. As each company differed in the type of solutions they had, their services ideas were slightly different. Three main categories of services were found: Customer service, Analytics and Quality assurance. Table 3 sums up the service possibilities suggested by the interviewees in the software firms.

Table 3. *Services based on data according to interviews in the software firms.*

<i>Analytics</i>	<i>Customer service</i>	<i>Quality Assurance</i>
Risk assessment	Operation support	Predictive maintenance
Process optimization	Monitoring of the installed base of equipment	Product quality feedback
Maintenance schedule optimization	Traceability to facilitate decommissioning.	Product development
Performance indicators	Configurations storage (cloud services)	
	Use patterns report	

These three categories seemed to have evident benefits for the customers, but the realization of new revenue streams based on them still represents a challenge for the

service developers in the manufacturing firms. For instance, in some of the services already implemented in manufacturing firm C, there was no monetary benefit as the services are given away for free or bundled with the equipment. However, this was used as a differentiator from the competition. For company F, the services are oriented to support and maintenance, therefore the revenues are constrained to the failure or upgrades of the equipment.

In each kind of industry, the environment and operation conditions play an important role too when there is an interest to implement new services. For Company C, the safety in the operations of their equipment as part of a critical process is one of the top priorities. Their equipment is not often active and the lifecycle is very long, thereby restricting the possibilities of the service offering. Therefore, companies may have different positions and tasks in the network, and there are diverse conditions that need to be fulfilled before the implementation of services based in ELD becomes successful. These topics are covered next.

4.2. Firms' position and tasks service delivery, based on ELD

Currently the manufacturing firms are heavily investing to understand and create new business cases related to services based on ELD. The challenge is to find benefits beyond the customer's satisfaction that can also represent a new revenue stream for the manufacturing firms. Related to this, interviewees particularly in Company C agreed that when they seek for the software partner's expertise, they expect them to provide new input and ideas based on what they have seen in other industries or cases.

During the interviews it was asked "what are the expectations on the potential software partners for the manufacturing firms?" and "what are the roles each actor played in a triadic network?" The recurrent answer was that software firms provide solutions that can enable the manufacturing firms to offer services based on their products. They do not necessarily need to operate jointly over the long term, as they can provide the tools and knowledge until the manufacturing firms have succeeded building their own capabilities supported by the software service providers. Company A's business analytics responsible stated...

"They [the manufacturing firms] go out and say, we need you to help us build the capability. Typically they don't want to outsource it all because they still feel that it's part of their core value creation. They see the importance of the data, and the software based model. So what they use us for, is help them build their internal capability and accelerate it, so they will be quicker. So it would mean that we might run for instance analytic services for them for a year or two, helping them at the same time build their own capabilities."

The manufacturing firms' interviewees expect much from the software firms, as their experience in the service business is wider and concerns different industries. The majority of the software firms' interviewees shared this opinion, as they believe they can support the manufacturing firms rather than take over their operations related to services based on data. The collaborative network is based on understanding the capabilities and needs from the partners. From the perspective of the manufacturing firms, the knowledge about their customers' needs and their own systems and products is the key for a successful collaboration. It was suggested that even though the

manufacturing firms have strong software development knowledge, they are constrained to a single industry, limiting their experience to their own field and not allowing them to see what the trends in other industries are. As the Business Development Director from Company E said, *“In every five years, you need to renew your own model and renew all your skills. Those lifecycles with these technologies are actually quite short, especially compared to the industrial systems that might have 30 years”*. It was also noted in one interview in Company F, that the industrial customers they serve tend to be more conservative than customers from other firms. This also influences the changes that can be done according to the trends in other areas and the experiences they have.

Furthermore, software firms’ interviewees believe according to their experience that they can build capabilities and optimize the industrial processes to support the manufacturing firms and their customers. Optimization is not merely about reducing costs, but also about getting more out of the existing systems and processes. Nonetheless, costs can be positively affected as the software firms absorb the costs of long development of service capabilities in manufacturing firms by using pre-built solutions and tailoring them for the specific needs their partners have. Those costs primarily are allocated in the intellectual capital as said in all of the software firms’ interviews, either by the software developers or the service and analytics consultants. In terms of physical infrastructure, the manufacturing firms have the possibility to build their own if desired i.e. servers to support the cloud services, but they can also rely on external partners to take care of that. This allows them to share the risk and take care of the investment costs. Table 4 summarizes the roles positions and key tasks of the manufacturing and software firms in a triadic collaboration network to provide services based on ELD.

Table 4. *Key tasks of the suppliers in a triadic cooperation for services based on ELD, according to the interviews.*

Software firms	Manufacturing firms
Create solutions based on software tools (i.e. visualization, reports, analysis, etc.)	Understand the customer’s needs
Help building capabilities	Provide equipment lifecycle data
Provide insight from different industries	Serve as an integrator, bring together software and equipment capabilities
Enable new services’ business models	

Building a cooperative network was considered as relevant by a couple of respondents and was seen as a larger network than just a triad. Having different providers with different expertise areas can enhance the service offering and improve the business possibilities of the manufacturing firms, while they also serve their customers better. As given in one interview from Company A: *“from the industrial manufacturer’s point of view, they could be collecting data and then looking at their wider value chain, taking and providing some of that data for use of their partners who could then utilize that somehow to create more value, added to the value chain”*. The focus on the suggested added value was in enabling new services based on data, where all the firms involved had experience in a specific field and then they could exploit it to create services.

4.3. Conditions for enabling and promoting industrial services, based on ELD

The equipment manufacturing firms are selling carry the most value to the customers and that has been the case for many years, making the transition to a product-service organization more complex. Different challenges were brought up during the interview sessions, where the most difficult was the realization of revenue via services when they are not the core offer from the firm. The pricing of services in the two manufacturing firms participating in this study has been an issue through time. As said by one of the managers in Company C *“How do we package all these services and put a price tag on it?”* It was then highlighted that the implementation of different services based on data was not due to lack of technological resources or motivation, but depended on the conditions specified by the customers and the difficulty to set an attractive price for the services.

Often the challenges about servitization rely on the lack of direct input from the customers, as their opinions and expectations come from the product and project managers instead of straight from the equipment and service users. On the other hand, if distributors and third channels are involved, the collection of customers' expectations is even more complicated. A solution would be having an online connection to the equipment to collect data to understand what the current status from the device is, helping the development and delivery of new features and upgrades.

As said by the software and services manager in Company A: whenever possible, data should be collected so it can be used in the future as historical data and improve forecasts or whatever services are designed. A challenge then becomes the integration of different sources of data in all sorts of formats. This has been an issue from the manufacturing and software firms' perspective. But as mentioned in Company C, if they had a standard for the information some competitive advantage would be lost. It seems that there is currently no way around that challenge. From the technological point of view, it is possible to integrate different data sources but it may slow down the process for their customers.

On the same technical line, issues regarding the security of the data were mentioned. During the interviews it was asked from the manufacturing firms' respondents what were they thoughts related to the data security and ownership, as they showed their interest since the beginning of the study. For the whole sample, the data ownership was clear: the customer owns the data that is generated by their equipment. Therefore the challenge on the industrial services based on the analysis of lifecycle data relies on the possibility to get that information from the customers.

This then connects to the security issue, as the customers seem reluctant to provide any kind of data to their suppliers when requested. From the manufacturing point of view it was said that as a basic principle *“information shouldn't be available to other people, as a customer I would like to be in charge of who can access the data”*. Nevertheless, it was mentioned that when the support service teams of Companies C and F asked for a log or other kind of information of the equipment, the customers did not hesitate to share the data as they knew the objective. When that is the situation, customers do not mind sending the information via email or through some other cloud service that may not count with enough security measures. Particularly in Company F's case, customers enable the online connection to the equipment for as long as the support team requires it, sometimes taking days.

"I'm not really sure about if that's kind of sensitive information. Because anyway, quite often they [the customers] are sending their configurations to us also over mail if they want to show that okay, 'we have some issue with this application, could you help us to get this correctly configured?' They send the configuration files to us, so I don't see that as a really critical."

For instance, with the current software tools of Company C, some services based on data have been enabled but there are still expectations to increase the offer if the customers were more willing to share their information. Nowadays the collection of data is technically possible, but human factors have slowed the servitization process. Personally, the majority of the interviewees were not comfortable sharing information through the Internet, therefore they understood why in a business-to-business context the customer firms would not allow their information to be shared with their supplier.

Company C had a specific case where data could be collected already from the equipment and stored in a cloud service if the customer activated it, but it was not very appealing for the customers as they could not see where it would be used on. In Company F, there is a possibility to be always connected and sharing data to the support team, but it is often disabled until there is a malfunction and the customers require assistance due to security concerns

In short, the interviewees agreed that sharing the information may not be that critical if there is trust in what the company is going to do with it and if the customer does not have to do any extra effort. Customers are also willing to compromise in a way their security when the breakdown costs are higher than the risk of opening the connection for some time while the support teams work to fix their problems. This is strongly connected with the first issue mentioned in this section, as the price tag that is connected to the service package needs to be good enough for both the supplier and customer. As the interviewee in Company B mentioned, it is a cost vs. benefit analysis for both the customer and the supplier, which is the manufacturing firm in this case:

"The customer is thinking about the potential 'pain and gain' if they give the data or access to the data. What do we get if we give it? If that ratio is enough, meaning that they feel they get more benefit than, like negative things when they give it. That's typically so big problem as it is seen in the market... (for the manufacturing firm) you need to give something, especially in the beginning, you need to be giving something even if it is for free, to get access to the data, because everything starts from that."

That opinion was shared at least to a certain level in the software services context, as the interviewees suggest starting by sacrificing something or giving a service for free to then gain access to the data and build business cases on top of that. It was still remaining to know what kind of sacrifices are the manufacturing firms willing to do to get access to the data, as they have not yet seen the full potential of the servitization.

To sum up, the involved interviewees in both types of firms mentioned four main challenges: revenues realization of the services based on equipment data, equipment data acquisition (ownership), equipment data management (integration) and data security. It was also a shared opinion that these are issues related to perception rather than technical capabilities, therefore the creation of an attractive business model would help them overcome the challenges.

5. Discussion

This study focused on manufacturing firms and software providers pursuing service-oriented business through enhanced use of equipment lifecycle data. The results show that the manufacturing firms' current services dominantly cover preventive maintenance, R&D processes of product development and process optimization inside the firms and for the customer, and such services are located in the second and third level when compared with the ones proposed by Kucza and Gebauer (2011) based on the knowledge intensity of services. Visualization and analysis tools were mentioned to create cost-benefit analysis, present performance indicators and visualize benefits. When compared with the services proposed by Yang et al. (2009), the preventive maintenance was again mentioned, as well as the use patterns report and better forecast to optimize the maintenance schedule.

Both the interviews and earlier literature emphasize that there are more possibilities than only preventive maintenance, in services based on ELD. Primarily the software providers emphasized many kinds of services (e.g. Risk assessment; Operation support; Monitoring of the installed base of equipment; Traceability to facilitate decommissioning; Configurations storage (cloud services); e.g. Oliva & Kallenberg 2003; Kucza & Gebauer, 2011, Yang et al., 2009). Product quality feedback) that are not, yet actively used by manufacturing firms.

By identifying the service possibilities, this study sets a starting point for more detailed studies oriented towards understanding the specific needs of each of those services and the possibilities to extending the service offering beyond the lifespan of the equipment, as originally suggested by Oliva & Kallenberg (2003).

5.1. Division of tasks in ELD-based service delivery

The first research question dealt with the division of tasks between the manufacturing firm and the software provider, in the delivery of services based on equipment lifecycle data. The results showed that the expectations on the network position and tasks of the manufacturing firms are generally consistent with the key findings presented earlier in the literature but novelty lies in the empirical evidence about the positions and tasks of the different companies in the service triad. As a contrast to the findings presented by Finne & Holmström (2013), the results in this study propose that the manufacturing firm acts as the **integrator** between the customer sharing ELD and the software firm, while also acting as the only direct service supplier to the customer. The results in this study also suggest that the subsystem supplier (i.e. software firm) acts as a partner in the co-creation of services besides providing the ICT tools for ELD processing. Due to the nature of the manufacturing firms' environment, software firms act as **enablers**, meaning their cooperation can end when the capabilities to provide services based on ELD have been built. Previous studies considering the analysis of data to enable services do not analyze the tasks that each company has in the delivery network. The previous literature covers the dyadic cooperation between manufacturer and customer (Sandin, 2015; Kucza and Gebauer, 2011) but do not look into the cooperation of a support service supplier (Finne & Holmström, 2013), even when talking about software tools to analyze the data (Yang et al., 2009; Vezzetti, 2009). This study contributes with the perspective of the software firm as a prospective subsystem supplier, differentiating this paper from the previous literature.

As mentioned in Mejtoft (2011), in a more traditional view value was created with minimal interaction with the customers. The triadic setting presented in Figure 2 positions manufacturing firms as integrators and they not only interact with customers, but also with a support service supplier in the successful use of equipment lifecycle data in industrial services.

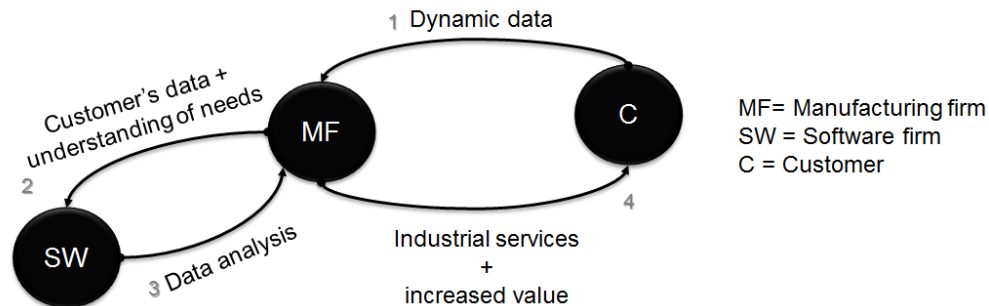


Figure 2: Triadic collaboration model between service suppliers and customer.

Deviating from the findings of Finne & Holmström (2013) where manufacturing providers cooperated with service providers in a direct supply chain toward the customers, the subsystem (software) supplier does not need to aim to keep in touch with the end customer, as the manufacturing firm integrates the software services and the customer needs. The triadic collaboration between software firm, manufacturing firm and customer is facilitated by different technologies such as wireless communication and analytical software tools, like the PLM system explained by Yang et al. (2007). The customer's equipment lifecycle data is collected and sent to the manufacturing firm that shares it with the software-based services supplier according to the customer needs. The software-based service supplier analyzes the data based on its experience in other industries and environments and can propose new services, different to the traditional approach of preventive maintenance.

5.2. Promoting the use of ELD for successful service delivery

The second research question asked about the ways in which companies in the network enable and promote the use of equipment lifecycle data toward successful service delivery. As seen from the empirical research, manufacturing firms have good potential to promote the ELD-based services even more widely. Various conditions need to be met to enable the use of ELD in services and ensure service business success. While the technical capabilities and requirements have been analyzed as in Vezzetti (2009), it is needed to overcome some other issues too. Mezgár & Rauschecker (2014) presented the main issues but did not proposed steps to solve them. In this study we identified four main challenges to be solved to enable and promote services based on ELD in a service delivery network successfully. These challenges and potential solutions are presented in Figure 3.

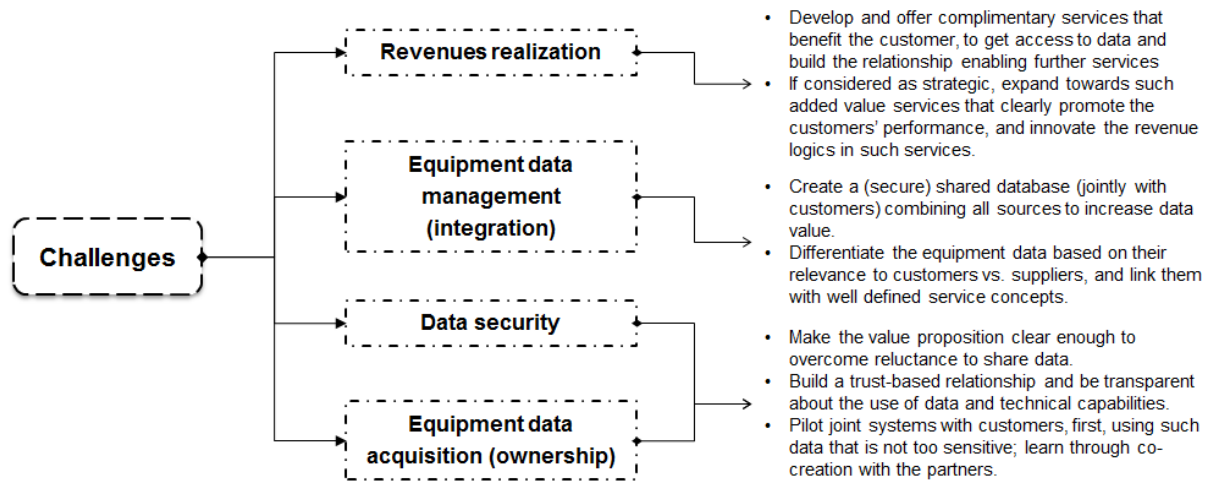


Figure 3. Implementation challenges and potential solutions (particularly for manufacturing firms).

It has been emphasized that the technical capabilities to keep the data secure are already available and previous studies can confirm that. Therefore the limitations to offer services based on ELD are due to human preferences and decisions, meaning that the security issues could be overcome when there is an attractive business offer from the manufacturing firm based on which data that could enable further business cases could be utilized. To make the implementation of services based on ELD possible it is essential that the customers are convinced that the communication channels are secure but more importantly, that they understand the benefit of sharing their data.

In Sandin (2015) a key finding was that monetary benefits are hard to measure in a partnership such as the one needed in this triadic collaboration. We argue that it is possible to measure the monetary benefits, for example when processes are being optimized through data analysis and costs are saved when R&D utilized historical data to update the equipment. Manufacturing firms may need to be willing to give away something to attain greater benefits and get the end customers on board to share their data. During a couple of software firms interviews, there were specific examples given from electricity and media industries where the companies started by giving away some services based on data to ensure customer loyalty, which later on enabled them to build more services on top of them. Giving the opportunity for the final customers to monitor their equipment or processes can enable the suppliers to get access to data and also understand the real use of their equipment without making big investments. Through these kinds of examples in other industries and their successful implementation of services based on data, software partners can provide a company-specific offer to the manufacturing firms to develop a new service business based on their equipment lifecycle.

6. Conclusions

Servitization in manufacturing companies has become a challenging trend, as the commercialization of products is not enough to differentiate from the competitors. In a traditional view, services related to products in manufacturing firms relate to maintenance and spare parts handling. With the use of ELD the service possibilities increase and could allow the manufacturing firms to realize new revenues from differ-

ent streams and have more satisfied customers. ELD use can also help the manufacturing firms to offer services even after the lifespan of the equipment has ended.

The first research question referred to the task division when delivering services based on equipment lifecycle data. With the idea of the importance of ICT evolution and possibilities for servitization in mind, we integrated the software service suppliers in the service delivery network of manufacturing firms. By relying in the software service suppliers' knowledge and experience, manufacturing firms can increase their service offering based on equipment lifecycle data. We studied the different points of view of manufacturing firms and software service providers and identified their position and tasks in a triadic cooperation network. The network is based on the idea where the customers utilizing the manufacturing firms' equipment provide the lifecycle data to the manufacturing firms to process and enrich it, enabled by a software subsystem supplier.

The empirical study allowed us to compare and consolidate the different perspectives of the manufacturing and software firms. By doing this, we answered the second objective of understanding how the firms in the service delivery network can enable and promote the use of ELD. Four main challenges were identified based on the experience of the manufacturing firms and existing literature: revenues realization, equipment data management, data security and equipment data acquisition. With the input from the software firms, potential solutions to improve the conditions for servitization based on ELD were suggested.

It is concluded that the participation of external software suppliers can benefit the service delivery in the manufacturing industry. Despite the high technological development in manufacturing firms, the lack of experience in a larger context from different industries may narrow the view of service possibilities. Software firms can add fresh ideas to the service delivery network to enable and promote services based on ELD. With a clear and attractive service offer of the manufacturing firms, customers might be willing to oversee the security and ownership concerns related to sharing their equipment's data.

This study was limited to the interpretation of the different stakeholders in a small sample of companies; therefore it would be recommended that a more thorough empirical case study be done to analyze the viability of these suggestions. Another recommendation is to integrate the customer's point of view in the study, to test and verify the assumptions of the suppliers related to what they expect and to what extent they are willing to share their data.

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Actor roles in the Internet of Things ecosystems

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This study investigates actor roles in the ecosystems of the Internet of Things (IoT). Previous studies suggest that unstructured ecosystems make one of the greatest challenges for creating business models for the IoT. Based on a literature review and analysis of data from five cases, we show how actors take and make different roles in the emerging IoT ecosystems, and address how they choose the business model and the type of ecosystem they want to get involved. We identify four diverse actor roles in IoT ecosystems: butterfly, ant and greenfly, spider, and the swarm of bees. The findings contribute to our understanding of the IoT by suggesting that emerging IoT ecosystems are structured in accordance with actor role behavior.

1. Introduction

In the near future, many kinds of everyday objects from cars to toothbrushes and buildings to baby monitors will be connected to the Internet and with each other. The Internet of Things (IoT) can be defined as a world where physical objects are seamlessly connected to the information network, and where these objects can take actively part in business processes (Haller et al., 2009). It integrates diverse technologies and systems (Fleisch et al., 2009) and creates a significant potential for companies, their customers and other stakeholders to produce, co-create and get better services cost-effectively. The networked infrastructure of the IoT enables incremental and radical innovation and business development (Bucherer and Uckelmann, 2011).

Despite the vast potential the IoT holds, the business promise has not yet been realised (Bucherer and Uckelmann, 2011). The diversity of objects, the immaturity of innovation, and the unstructured ecosystems are proposed to be primary challenges for developing business models for the IoT (Westerlund et al., 2014). Thus, more research is needed on how the technological opportunities can be realised from the business perspective (Haller et al., 2009; Leminen et al., 2012; Leminen et al., 2014). New business models will be needed for this emerging highly-connected world. Previous literature on the IoT has underlined technological issues, but IoT business models have been discussed sparsely. In fact, prior literature calls for more research on the emerging IoT ecosystems from the business perspective (Leminen et al., 2012), and argues that studies on IoT business models should be widened from a single company point of view to an ecosystem perspective (Westerlund et al., 2014).

This study investigates the actor roles, and adjacent business models, in emerging IoT ecosystems. Our research questions include: i) which roles can actors take and

make in emerging IoT ecosystems?, ii) how are these ecosystems built?, and iii) how are the role options linked to the emergence of IoT ecosystems?

The paper is organised as follows. After this introduction, we review previous theories on ecosystems, particularly the IoT ecosystem, and actor roles. Thereafter, we explain the methodology and present key findings. Finally, we conclude by discussing the key implications of our research both to practice and the theory, and provide avenues for future research.

2. Literature review

Next, we briefly review literature on IoT ecosystems, particularly related to IoT ecosystems and their business models, as well as actor roles in those ecosystems.

2.1. The IoT ecosystems

The concept of business ecosystem originates from James F. Moore in 1993. He emphasises that innovative businesses cannot succeed alone, but they must rely on various resources. Businesses need capital, partners, suppliers, and customers to create cooperative networks. According to the ecosystem view, a company is not just a member in a single industry, but a part of an ecosystem crossing multiple industries. In ecosystems, companies act cooperatively and competitively developing new products and satisfying customer needs together. Since Moore, ecosystems have been a popular topic in business and technology research. Burström et al. (2014) point out that the ecosystem studies focus on large companies. Hence, there is a lack of studies on the roles of small and medium sized organisations in ecosystems. Tukiainen et al. (2014, 9) classify ecosystem research into four streams: product studies, company studies, industrial studies and meta-studies. Product studies refer to research on ecosystems as e.g. “mobile phone ecosystem” or “microprocessor ecosystem”, whereas company studies describe e.g. “Amazon’s web service ecosystem” or “Google’s innovation ecosystem”. Industrial ecosystems may be, for example, “ICT ecosystems” or “automotive ecosystems”. Meta-studies refer to wider studies of “business based ecosystems” or “technology based ecosystems”.

In the future, a large number of small and specialised “things” (devices and sensors) will be connected to each other and to the Internet, expanding existing Internet applications and services and enabling new ones (Leminen et al., 2012). The IoT increases complexity of communications. Complexity is increasing and network structures are transforming from centralised structures towards decentralised and distributed structures when businesses become participants of complex business ecosystems (Barabasi, 2002; Möller et al., 2005). Actors are increasingly interdependent through technical and business ties, and thus developing their roles. The ecosystem view and actor roles will be more and more important. Tarkoma and Katanov (2011) argue that an IoT ecosystem is a community of interacting companies and individuals where the companies use a common pool of core assets, based on linkages of physical world of things with virtual world of the Internet.

Leminen et al. (2012) note that the existing literature lacks sufficient understanding and empirical research on IoT business models and their connections to the underlying ecosystem. The authors (ibid.) propose a framework to visualise a variety of existing and potential IoT business models and to distinguish four diverse IoT business model categories. Prior research on IoT business models has identified versatile challenges related to the IoT ecosystems (Haller et al., 2009). For instance, Westerlund et al. (2014) mention the diversity of objects, the immaturity of innovation, and the unstructured ecosystems as challenges. The latter challenge refers to the fact that participants and their roles are not yet clear in the emerging IoT ecosystems. Thus, by focusing on the ecosystem approach of doing business it is possible to overcome the challenges and design successful IoT-enabled business models.

Given the rapid development of IoT, increasingly complex ties between things and actors highlight the importance of ecosystem view on studies of IoT business models. Westerlund et al. (2011) discuss business model management and propose that various business models and their differences in the ecosystem context can be studied by linking business models with the firm's external strategy and relationships. They also suggest a shift from business model of a firm to ecosystem business models (i.e. value designs). Westerlund et al. (2014) argue that further business model frameworks are needed to understand these value designs because existing frameworks focus on the architecture of the business model rather than capturing the dynamics of the model. The value design demonstrates how value is created and captured in an ecosystem, and it can be conceptualised by four pillars: value drivers, value nodes, value exchanges, and value extracts. Value drivers are motivations of participants to generate value, realize innovation, and make money. Involving stakeholders in a "win-win" relationship is important for designing viable IoT business models (Bucherer and Uckelmann, 2011; Westerlund et al., 2014). Value nodes can be actors, activities, processes, or networks of organisations linked with other nodes to create value. Value exchanges describe an exchange of value, i.e. resources, knowledge, and information. Value extract refers to a part of ecosystem that extracts value. Any part of the ecosystem's business model can be described with the value design. This part may be single activities, individuals, organisations, networks and value flows between these nodes.

2.2. Actor roles in ecosystems

A role refers to expected behaviour of parties in particular positions (cf. Allen; van de Vliert, 1984). As actors pursue role-taking or role-making, Nyström et al. (2014) argue that in open innovation networks this '*role ambidexterity*' means that actors (individuals or organisations) must both *take and make roles* that benefit them and the network. One example is that if users in living labs wish to solve problems in their everyday life, they need to change their "taken" tester roles into co-creator roles, and thus "make" their role. '*Role temporality*' suggests that actors should avoid getting stuck in their roles and pursue to their best possible roles. It is important also for the network that participants can adjust and adapt to the structural changes in the network. However, role transitions are always challenging.

Nyström et al. (2014) argue that previous role theory research has three approaches: the structuralist, symbolic interactionist, and resource-based views. The structuralist approach proposes that a firm comes into an established social structure and fills a particular position. Symbolic interactionist roles are dynamic, describing what actors

intend to do; in other words, actors in networks are active in constructing their operating environment. The resource-based approach argues that a role is a resource, so that it means a membership and acceptance in a social community, and access to different kinds of capital – social, cultural, and material. Based on innovation research, Nyström et al. (2014) suggest a fourth theoretical view to roles; an action-based approach. They claim that the prior literature sees the innovator roles and tasks as actions that should be taken for innovation to occur. This can be seen as normative approach to roles. Heikkinen et al. (2007) identify roles by mapping actors' tasks in innovation networks. They (ibid.) find several role-related tasks: 1) the webber decides which actors should be contacted, 2) the instigator guides the actors' decision making, 3) the gatekeeper makes decisions and owns significant resources, 4) the advocate distributes positive information, 5) the producer contributes to development, 6) the planner gives resources for development, 7) the entrant interferes in development, and 8) the auxiliary takes an active part in the end of the process, 9) the compromiser balances actions and relationships, 10) the facilitator provides resources but does not interfere, 11) the aspirant aims at becoming a part of the network, and 12) the accessory provider promotes its products, services, and expertise. The actors' actions determine their roles, and some of the roles are more incremental or radical, or more expected or emerging (Heikkinen et al., 2007).

In their study on open innovation networks, Nyström et al. (2014) confirmed seven previously identified roles (cf. Heikkinen et al., 2007), but also proposed ten new roles characterised by openness and user involvement: 1) the coordinator who is a focal network actor, acting as a “focal network hub”, 2) the builder promotes close relationships between participants, 3) the messenger forwards and disseminates information, 4) the facilitator directs and motivates the users towards a specific direction, and provides them with intangible resources, 5) the orchestrator orchestrates the whole network of actors, 6) the integrator integrates knowledge, development ideas, technologies, and outputs of different living lab actors into a functional entity, 7) the informant is a user that brings users' knowledge and opinions to the living lab, 8) the tester is a user testing innovations in real-life environments, 9) the contributor is a user collaborating with other actors to develop new products, services, processes, and technologies, 10) the co-creator is a user that co-designs a service, product, or process together with firms and other living lab actors. However, it is not required that all roles are active for a network to operate satisfactorily.

Ecosystem literature documents different actors in ecosystems rather than focuses on actor roles. Burström et al. (2014) argue that the post-Moore (1993) research has not brought up too much knowledge about leadership and control of ecosystems. The main body of studies propose close links between technology development, platform leadership and ecosystem leadership. The ecosystem approach relies on an analogy with biological ecosystems (Moore, 1993; Iansiti and Levien, 2004). As in biological ecosystems, participants in business ecosystems are interdependent with each other for their development and survival. Although some actors are stronger than others, a single actor cannot control the entire ecosystem. In fact, the ecosystem can be understood as relationships between actors where they take different roles as keystone, dominators, or niche players. Ecosystems also typically reach several domains, and they also may have shared domains with other ecosystems (Iansiti and Levien, 2004; Burström et al., 2014). Burström (2010) emphasises the importance of an inter-firm platform for firms' strategy, operations, and functions. Therefore he claims that platform development should be seen critical for the development of various business ecosystems. Huang et al. (2009) in turn submit that small and medium-

sized enterprises (SMEs) may need strong intellectual property rights and/or the possession of complementary capabilities that protect them from being overrun by platform owners in the ecosystem. Moreover, Burström et al. (2014) urge more research on issues such as what roles SMEs play in business ecosystems, and whether and how SMEs can collaborate and compete at the same time in business ecosystems.

Tukiainen et al. (2014, 15) suggest that there are both key actors and supporting actors in ecosystems. The key actors are large firms and SMEs, as the SMEs mainly work as partners or complementors for large firms that are, or want to be, platform leaders in business ecosystems. Tukiainen et al. (ibid.) also argue that besides these key actors there are supporting functions in ecosystems that can be served by universities, governments and funding agencies. They (ibid, 39) also note that companies may have different strategies related to ecosystems: in single ecosystem strategy, a company concentrates acting in one ecosystem only, for example as an application provider using ecosystem leader's distribution channels; in multiple ecosystem strategy, a company connects across ecosystem boundaries, but the boundary is not changed. For example, a system supplier could connect to various ecosystems without changing the rules of game in a particular ecosystem. In a multiple ecosystem strategy with boundary spanning, a company presents new ways of doing business that change the rules of game and boundaries of the ecosystems. The example of the last mentioned case include Apple and its iOS ecosystem.

Tukiainen et al. (ibid., 23) use Gawer's (2009) framework for platform innovation and competition to categorise ecosystem companies into four groups based on low versus high autonomy to innovate and low versus high likelihood of competition in the ecosystem (see ibid, 37-38). Group 1 companies produce software products in low technical and low or medium market uncertainty. The business is easy to start and based on exploitation, and the rules are known and followed. Group 2 includes platform wannabes acting in high market and technological uncertainty. There is no clear market, and rules of the game are unknown. Huge investments are needed for starting a business based on exploration; there are also huge risks and opportunities. Group 3 consists of service or system integrators. There is a low technical and medium market uncertainty and the business is easy to start based on exploitation, but it is difficult to internationalise. The rules of the game are known, but the company needs good customer relationships and various kinds of expertise. Group 4 comprise solution providers acting in medium to high technical and market uncertainty. Some of the rules are known, but not all. The business is based on exploration, and there are huge risks and opportunities.

Given our review on the role theory and research on actor types in ecosystems, the extant studies fail to integrate ecosystems and the role theory. In particular, more research on actor roles is needed in ecosystems.

3. Methodology

This study drew empirical data from semi-structured interviews with eight interviewees in five different organisations in the emerging IoT ecosystem.

3.1. Research setting and research design

We draw on a multiple-case study design approach with cross-sectional data from different industries to generate evidence on actor roles in the emerging IoT ecosystem. As suggested by Jensen and Rodgers (2001), we deploy snapshot studies on cases. We focus on case comparisons because each analysed case share similar elements, allowing us for typifying role characteristics, as well as different business models in the context of the IoT ecosystem.

3.2. Data collection

The empirical data were collected from 2012 through 2014. The original data set included a three-round Delphi study and sixteen interviews. The Delphi study aimed at mapping Finnish experts' views on current and future IoT business models. The first round of the study was launched in early 2012, and the 3rd round took place in mid-2013. From the sixteen in-depth interviews we selected interviews that in particular dealt with actor roles in the emerging ecosystems. Thus our empirical data comprised eight in-depth interviews representing five key organisations in the emerging IoT ecosystems. The interviews were conducted to understand different types of IoT ecosystems and roles that actors can have in them. We followed an interview guide suggested by Patton (1990), and collected information on various themes. The interviews were carried out face-to-face, and each interview lasted between 60 and 120 minutes. The interviews were recorded and transcribed for the purpose of analysis. The interviewees offered different views organisations have in building or joining the IoT ecosystem, which enabled broader perspectives to actor roles in the IoT ecosystem. Table 1 gives an overview of the empirical material.

In-depth interviews	
Topics discussed	IoT in general; interviewee's organisational aims and views regarding it. Description of the emerging IoT ecosystem and networks, actors and their roles, business models, expectations, tasks and activities performed by the organisations, and key challenges in the IoT ecosystem and networks
Person interviewed	<ol style="list-style-type: none">1. Manager, Multinational Telecom operator, March 20122. Manager, Multinational Telecom operator, March 20133. Manager, Multinational Telecom operator, November 20134. Manager, Local Telecom operator, March 20125. CEO, Local Telecom operator, March 20146. CEO, Supplier of Construction Components, December 20147. CEO, Technology Start-Up, November 20138. Manager, Network Solution Company, April 2014

Table 1: Overview of the empirical material of the study.

3.3. Data analysis

The empirical data were organised according to the informant, the date of interview, and the type of informant. Two researchers independently analysed and coded the interviews. They searched for words associated with business networks, ecosystems, business models, actor roles, role expectations and role activities by using the con-

tent analysis technique. The aim of the coding and content analysis was to better understand the cases (Roberts, 1997; Neuendorf, 2002). The empirical material was first coded by two authors, and the identified business models, networks, ecosystems, roles, expectations and activities were compared and discussed in the team. In the second phase, we analysed more thoroughly the actor roles in the emerging IoT ecosystem. This involved a second round of coding using content analysis with the aim of understanding the emerging ecosystem, different types of ecosystems and related actor roles, expectations and activities. At this stage, we analysed case-specific roles in detail, particularly from the point of view of role theories presented by Heikkinen et al. (2007) and Nyström et al. (2014), and ecosystem theories presented by Burström et al. (2014) and Tukiainen et al. (2014). We also wanted to identify the emerging value designs in the IoT ecosystem as represented by Westerlund et al. (2014), i.e. value drivers, value nodes, value exchanges, and value extracts. After comparing our interpretations with prior research, we identified new approaches to actor roles in the IoT ecosystem. Table 2 gives an overview on our data analysis and the phases of the study.

Data analysis phases	Task	Outcome
1. Open coding	<ul style="list-style-type: none"> Organise IoT expert interviews Identify main topics in each case 	Overview of expert views on the emerging IoT ecosystem, actors and business models
2. First round focused coding	<ul style="list-style-type: none"> Compare data to theory 	Comparing business models, networks, ecosystems, roles, expectations and activities with theories of roles in Heikkinen et al. (2007) and Nyström et al. (2014), ecosystems based on Burström et al. (2014) and Tukiainen et al. (2014), and value designs based on Westerlund et al. (2014)
3. Second round focused coding	<ul style="list-style-type: none"> Describe actor roles, and value designs in each type of ecosystem 	Classification of roles, types of ecosystems and value designs
4. Identifying roles and types of ecosystems	<ul style="list-style-type: none"> Analyse actor roles in different types of IoT ecosystems Compare data to theory 	Detecting previously unknown types of ecosystems and actor roles in the emerging IoT ecosystem
5. Theorising the codes	<ul style="list-style-type: none"> Synthesise phases #1-4 	Characteristics of actor roles in the emerging IoT ecosystem

Table 2: Data analysis process.

4. Findings

Previous studies suggest that unstructured ecosystems make one of the greatest challenges for creating business models for the IoT. Our literature review on the role theory illustrates how actors make or take roles in ecosystems. Based on our data

analysis from eight in-depth interviews, we identified four diverse roles for actors in IoT ecosystems. Our case study shows that these roles are typical in four distinct types of ecosystems. We label the roles as: (i) *butterfly*, (ii) *ant* and *greenfly*, (iii) *spider* and (iv) *the swarm of bees*. We also suggest that a company can choose the type of ecosystem it wants to be part of, and, consequently, its role in the ecosystem. Therefore, companies benefit IoT by different roles. Next, we will discuss the findings of this research. First, we will briefly describe the case companies, and then present our findings on the role configurations in the emerging IoT ecosystem.

4.1. Case companies

Case A is a Finland-based component supplier for the construction industry. The company is interested in opportunities of the IoT in connected buildings, and is developing their product and service offering. However, they are aware that being unable to add connectivity to the products, the company probably will lose deals to competitors that may be ahead in satisfying high-end customers' advanced needs. Case A has a role configuration of a butterfly.

Case B is a multinational company offering network solutions. The company sees both opportunities and enormous threats in the IoT, and has not yet found significant business opportunities or lucrative roles to position itself in the IoT ecosystem. Although Case B is used to offering services to multiple business ecosystems, it is either unable or reluctant to become an active actor in building new business networks. We describe the role configuration of Case B as an ant and greenfly.

Case C is a multinational telecom operator enthusiastic of being actively involved in building business networks to employ opportunities of the IoT. The company is already offering machine-to-machine (M2M) communication services to their business partners, but aims to be more proactive in regards to the IoT due to the threats coming from large global actors such as Google. However, Case C perceives challenges in understanding the differences between building business relationships in the M2M vis-à-vis the IoT context. The role configuration of Case is termed as a spider.

Case D is a Finland-based telecom operator operating on a local market. The company is considered to be as an active business network developer or accelerator in the local community. Moreover, they aim to build networks and business models that can be replicated in other contexts. Similarly to Case C, we describe the role configuration of Case D as a spider.

Case E is a small, Finland-based technology start-up developing sensor-based solutions. The company wants to be closely connected to users and user communities with whom the company wants to develop IoT-based products and services. In terms of role configuration, we view that Case E is involved in a swarm of bees.

4.2. Role configurations and ecosystems

In our empirical study, we found four roles that actors can have in the emerging IoT ecosystems. A *butterfly* focuses on relatively compact issues, and this role configuration leads to limited but rather safe business model choices. Case A recognises the nodes (customers) and flows (possible products and services.) of the new business

model. No specific IoT ecosystem is needed because the IoT solutions are add-ons offered in prevailing ecosystems (cf. Fig. 1, butterfly, point of time 1 and 2). The company concentrates on one customer relationship at a time, and in providing IoT-enabled products and services in these relationships. This is an example of role-taking: the butterfly takes a predefined organisational role in an existing product ecosystem. It focuses on creating links (value designs) with single nodes in the network, and on replicating these links into as many relationships or networks it can. Referring to Tukiainen et al. (2014), we argue that the rules of the game are known or easy to learn in this kind of “*Product ecosystem*”: There are only minor technical or market risks. No large investments are needed, and the actors can easily take a predefined organisational role in an existing product ecosystem.

”It is very important for us that we don’t compete with our customers.” (Case Company A, Supplier of Construction Components)

“We have a number of partners worldwide. Our value chain has several steps, wholesales, installation etc. There are many kinds of integrators involved – it is a very multifaceted model. After we have managed to specify our products into a project, after that it is quite straightforward. Preparations are crucial. Our competitors don’t use our components.” (Case Company A, Supplier of Construction Components)

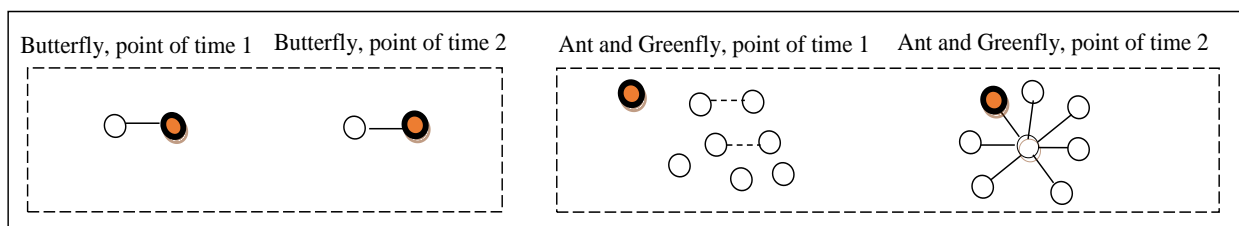


Fig. 1: Role configurations and emerging networks and ecosystems, part 1.

An ant and a greenfly refers to a role configuration in which a company may lock itself into larger “company ecosystems”, similarly to an ant sucking sap from a greenfly. The ant can start sucking sap as soon as the network (the greenfly) has been established (cf. Fig. 1, Ant and Greenfly, point of time 2). Ant views and compares a variety of supplementary nodes and links between companies that are not utilised at a particular moment. It wants to define (make) its role so that it can easily take a similar role in as many future networks as possible. Case B wants to understand the motivations and business logics of different actors, but the company thinks that several actors, and particularly intermediaries, are still missing in the emerging networks. Case B wants to grasp the opportunities by offering infrastructure services for actors in several networks, but for the moment they feel a bit frustrated because the company cannot do anything else but wait until the company ecosystems have been built by the focal actors. As soon as the challenges have been overcome and the IoT-based networks start to mature, the ant may offer boundary crossing services for several networks. The ant takes the roles that open up for it in the emerging ecosystem, but at the organisational level the company makes (defines) its role itself. Apple and Google ecosystems make good examples of “*Company ecosystems*”. The rules of the game are known, but given by the ecosystem owner. Other actors can only take roles that open up for them in the ecosystem.

"We cannot sell networks if we don't know how they are used." (Case Company B, Network Solution Company)

"The telecom operators don't want to develop IoT services. That is why we now have to discuss directly with their customers. Probably there is an actor missing, an intermediate." (Case Company B, Network Solution Company)

"Did the revolution already happen, but we just do not know it yet? If big companies don't wake up, small companies will take over." (Case Company B, Network Solution Company)

A *spider* weaves its own network in the IoT ecosystem. It may aim to become a key, hub, or leading part of the network. In this case, it could be described as a "platform wannabe" (cf. Tukiainen et al., 2014, 38). However, the spider can also take a minor role after the network has matured. Cases C and D wish to take active roles and build IoT-based company networks (cf. Fig. 2, Spider types 1 and 2, point of time 1). Case C also pursues becoming a focal actor in the ecosystem (Spider type 1, point of time 2). On the contrary, the most important driver for Case D is to get the network going, after which the company can take any role that is suitable for it (Spider type 2, point of time 2). The case companies aim at replicating their network models into different contexts, either geographically or into other industries. Thus, the spider concentrates in building a viable network, and in replicating this network structure with all its value designs into different contexts. The rules of the game are at least partly unknown, investments are needed, and there are risks related to technology and market. However, by being active in building the ecosystem, Cases C and D try to manage the risks and guarantee that the emerging rules of the game will be beneficial for them. Cases C and D cannot cooperate, rather consider each other as competitors. For the time being there are many open opportunities, and genuine IoT-based new networks crossing multiple current industries (for example health, wellbeing and IT) are still emerging. We call these "*IoT-based industry ecosystems*". Some of the rules are known, but not all. The business is based on exploration, and there are huge risks and opportunities. The ecosystem roles are all emerging, and the actors can offer their expertise (or roles) to be taken part of the emerging ecosystem.

"We have a big partner network. We have asked them to build applications for us. So, our partners build the solutions. We also have a partner who has built us the platform and we sell it to our customers." (Case Company C, Multinational Telecom Operator)

"The model will be same in every country. Services cannot stop in the border of the country." (Case Company C, Multinational Telecom Operator)

"We can build business models, where we use local actors as partners. In our region there is knowhow related to sensor technology in universities, and there are small software companies, etc. Partnering with them will guarantee that knowhow stays in the region. However, these should be concepts that we can replicate to other similar regions. For this purpose we have started to build a developer business model and a piloting environment" (Case Company D, Local Telecom Operator)

"We have to test things at local level first. Then we can go forward." (Case Company D, Local Telecom Operator)

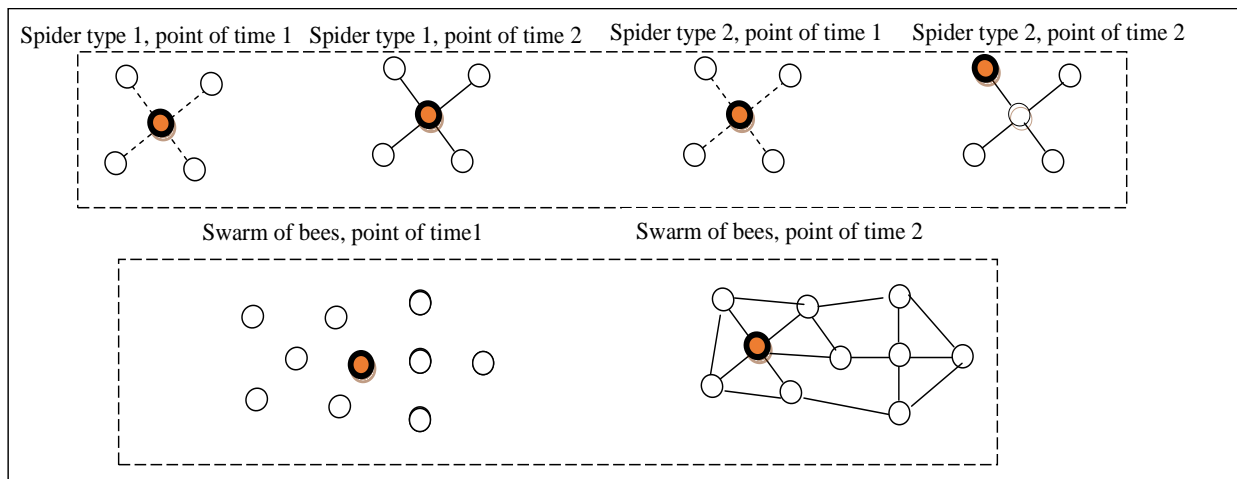


Fig 2. Role configurations and emerging networks and ecosystems, part 2.

New kinds of value designs may emerge for a *swarm of bees*. For example, bottom-up models may arise from the IoT user and developer communities, where users share their own expertise and knowhow and become producing actors (Fleisch, 2010; Kortuem et al., 2010). The case companies were not yet actively involved in these kinds of networks, but our interviewees mentioned some examples. Case E, a small technology start-up, was very interested in involving user community in its product development processes. Actors in these networks have “swarm intelligence” which can be described as collective behaviour of decentralised, self-organised systems. This concept was introduced by Beni and Wang (1989) in the context of cellular robotic systems. The actors in a swarm follow very simple rules, but local interactions lead to the emergence of “intelligent” global behaviour, and the swarm being able to adapt to changes in the environment. There may also be some division of work (roles) between the bees of the swarm, i.e. explorative work can be done by scout bees in addition to local exploitative work done by other bees (cf. Pham et al., 2005, Karaboga, 2010). In “*peer-to-peer ecosystems*”, technological and market uncertainties are great, but at least part of the risks can be shared with collaborative models by the community. As each actor makes its own role by defining the role at the organisational level, the actors configure the ecosystem and make the roles of the ecosystem together and evenhandedly. As mentioned earlier, in order to succeed, the IoT business models need to motivate all actors, including customers and end-users. Therefore, this landscape of cooperative ecosystems is not easy for big companies. However, they can build their business models around cooperative ecosystems. For example, Über and AirBnB have built their business models so that they involve the community in the value creation process, and at the same time distribute a share of the profit to the community members.

”People will have more knowhow, so that in the future they will be able to build IoT devices for themselves. However, you cannot assume that everybody who has a personal problem, say a heart condition, is a technology wizard; therefore there is a challenge, how we can offer easy enough tools for every possible user, not just for the nerds.” (Case Company E, Technology Start-Up)

”The culture of open hardware and open software is getting stronger. People want to become “makers”. There are many bottom-up opportunities in the IoT, and if you can provide a good solution to a particular user group, you can easily replicate it to a different group. This is difficult for big companies, and therefore there are many opportunities for small companies.” (Case Company E, Technology Start-Up)

"There are services in the internet where people can do things themselves for free. This could have been a business opportunity for somebody, but when people learn to do things themselves, these business opportunities become extinct." (Case Company E, Technology Start-Up)

"Even if you have scarce people resources, you can reach the right resources through the peer-to-peer network. We don't want to get involved in high volume business, because top-down models don't work in a high cost country. We have started from the open hardware culture, and it is a rather strong trend globally. The main point is openness. " (Case Company E, Technology Start-Up)

In our interviews, although the interviewees thought that there is a great potential in the development of new cross-industry services and value creation based on the IoT, efficiency was mentioned as the most common driver of adapting IoT at company level. For developing new cross-sectoral IoT-enabled products and services, the actors must step out of their current roles. Companies that mention efficiency as the greatest driver for developing IoT-enabled products and services, generally deploy the role of a butterfly, or, in some cases, the ant and greenfly. Companies' current organisational structures create challenges, because they are designed to support current business models and for delivering products and services for present customers or sectors efficiently. Therefore nobody has responsibilities to develop new cross-sectoral IoT solutions, and nobody has incentives to sell them. IoT solutions are not easy to sell because nobody knows yet exactly the real benefits of using these solutions. Some of the experts we interviewed perceived the IoT as 'business as usual' for their company, as M2M solutions have been around since the 1990s. Companies that try to add IoT into their current products and services, deploy the butterfly's role.

However, at least some of the interviewed experts saw possible disruption in their own networks due to the global nature of the IoT business. We interviewed both local and multinational actors who want to build IoT solutions together with partners (thus, themselves working as spiders in the emerging ecosystem). In particular, they want to find smaller firms who develop IoT services in close cooperation with the customers. The local telecom operator (Case D) we interviewed pursues for a role as a local business developing company working with local partners (thus, a role of a spider). It is especially interested in offering services for municipalities. However, there are challenges for the telecom operators, because there are not enough promising IoT service developers available for their networks. Furthermore, in the IoT field, there will be also global actors who act according to their own logics and rules. Thus, there will not be lack of wannabe spiders. In our interviews the experts claimed that some industries have factors that slow down the development; for example, there may be regulation that creates barriers for entering the market, or there are strong incumbents, or the market structure is fragmented. One of the most interesting, but also problematic areas is the health sector, where all the factors mentioned above are valid. There are strong incumbents, fragmented markets, and strict regulation.

"Regulation in the public sector makes it fragmented, and it is very difficult to develop services or to get customers there." (Case Company D, Local Telecom Operator)

Bottom-up models of the IoT will emerge, because peer-to-peer communication becomes easier and cheaper, but also because big companies have certain inertias that slow down their innovations. The experts we interviewed mentioned some examples of bottom-up models; for example after the disaster at the Fukushima nuclear

plant a group of citizens who did not trust information provided by authorities, organised radiation follow-up with their own sensors and published their observations in the Internet. Other examples referred by the experts are weather detection networks, e.g. Lightningmaps (www.lightningmaps.org), which are communities of volunteers. The value drivers for an individual bee taking part to these bottom-up swarm models can be getting trust-worthy information services cost-efficiently, or getting money by selling their own expertise or resources to other users. This means that users may share their own expertise and knowhow and become producing actors (Fleisch, 2010; Kortuem et al., 2010).

5. Conclusions

This research aimed to investigate actor roles in the ecosystems of the Internet of Things (IoT). The findings contribute to our understanding of the IoT by suggesting that actor roles are limited by the type of an ecosystem, and, subsequently, emerging IoT ecosystems are structured in accordance with actor role behavior. Furthermore, this study highlights the following four contributions to the ecosystem and role theories.

First, designing and analysing business models for the IoT ecosystem require new methods. Actors in the emerging ecosystem are still searching for their roles, and the ecosystem lacks many actors, especially new kinds of intermediates. By using the role theory as a tool for analysing the emerging IoT ecosystems, we show that there may be many roles that actors can have in the IoT ecosystems.

Next, the study identified four new actor roles companies can use in IoT ecosystems namely: *butterfly*, *ant* and *greenfly*, *spider*, and the *swarm of bees*. A *butterfly* focuses on compact issues, leading to limited but rather safe business model choices for a company. An *ant* may attach itself into a larger “company ecosystem” (*greenfly*), as soon as it has been formed. A *spider* weaves its own network in the IoT ecosystem. It may aim to become a key actor (spider type 1), or it can take a more modest role in the network (spider type 2). New kinds of value designs, bottom-up models, may emerge for a *swarm of bees*, in which the users share their own expertise and knowhow and become producing actors.

Third, the study suggests that a company can choose the type of network or ecosystem it wants to be part of, and its role in it. It can also decide how active it is, and it can either make or take its role in the network. The results show that each of these four roles is associated with a specific type of ecosystem. We distinguish between four types of ecosystems: *product-*, *company-*, *industry-*, and *peer to peer*. This study demonstrates that these types of ecosystems have different value design logics, and different logics of taking and making roles.

Fourth, this study showed how actors can aim to *replicate* their role-based value designs (*butterfly* and *ant*) or whole network structures containing value designs (*spider*).

For managers, this study increases understanding of the role configurations that companies can have in the emerging IoT ecosystem; more specific, how companies

can make or take their roles, and how the roles are connected to business model opportunities and challenges in the ecosystems on the organizational and ecosystem levels. The global nature of the IoT may bring forth new global actors, but also user-centric bottom-up models emerge. Thus, there are many possibilities for disruption of the current models. We argue that the major challenges in emerging technology fields and in emerging business ecosystems, such as the IoT environment, do not lie at the company level, but at business network or ecosystem levels. It is challenging to design business models based on new radical technologies, because the technologies have not yet matured into products and services, and the actors and their roles are not yet formed in the evolving ecosystem (cf. Westerlund et al., 2014). This study offers some tools for analysing these issues.

In this study, we give examples on how to analyse actor roles and ecosystem business models with the role theoretical and ecosystem approaches. We have also employed the value design tool in analysing IoT-enabled business models. The data covered the emerging IoT ecosystem from the Finnish perspective, in its early stages. However, due to several research gaps, ecosystem business models and actor roles in the IoT ecosystems should be studied more in the future. Also there is a need for more research on the dynamics of ecosystems, and development of actor roles over time. The analysis methods presented and tested in this paper constitute first attempts to show how ecosystem business models and actor roles in ecosystems can be analysed.

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Utilization of Text Analytics in Service Development

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Abstract

Unstructured information, distributed via different channels are becoming more and more important for the business and service development. Customer create a number of different data about the company and its services. Channels like blogs, social media, emails or customer calls are few of sources of these data. Companies are relatively easily able to obtain these information. The challenge for them is to utilize these data for the improvement of its operations and services. We believe the knowledge-based intelligent system can play an important role for the service development, for the improvement of existing and creation of new services alike. We propose and explain such system in this research

Key words: Service development, ICT, Knowledge management, Information Extraction, Big Data

1. Information technologies in service development

Business today utilize modern information technologies more and more often. In this section, we aim to illustrate the importance of these technologies for the servitization and service development. Our approach is to aggregate a large body of literature and examine whether authors discuss information technologies (ICT) in their research.

1.1. Literature search and selection

We were searching for academic publications on the Google Scholar with a clear set of criteria. The full list of criteria we have established:

- Search on the Google scholar (scholar.google.com)
- The most cited articles (sort articles by number of citations)
- Only full articles published in English
- Only papers published between 2011 and 2015
- The following keywords research strings have been used, obtaining the following results: “servitization” AND “service development”

Originally 534 items were displayed with the number of citations in ranges 0-112. In the next step we selected 50 the most cited available articles.

Articles were then searched for keywords in the body of the article not in their references. Terms “Information” and “Technology” were analysed independently of their instances in the phrase “information technology” or “information and communication technology”. Table 1 reports findings of our analysis. It is important to point out all 50

articles contained string “customer” which is not a surprise as the topics of these articles are servitization and service development. On the other hand it is interesting a relatively large number of articles contain phrases “information” and “technology”, while relatively small number of articles contained terms “information technology” (IT) and “information system” (IS). Same results are reported in a graphic way in the Figure 1.

servitization AND service development AND	# of articles
ICT / Inf. & comm. technology	14
Information	47
Technology	45
Information technology	17
Information system	18
Customer	50
Customer centric / focused / centricity	10
Customer oriented / orientation	11
Consumer	31

Table 1: Number of articles with keywords in the text of the article (out of 50)

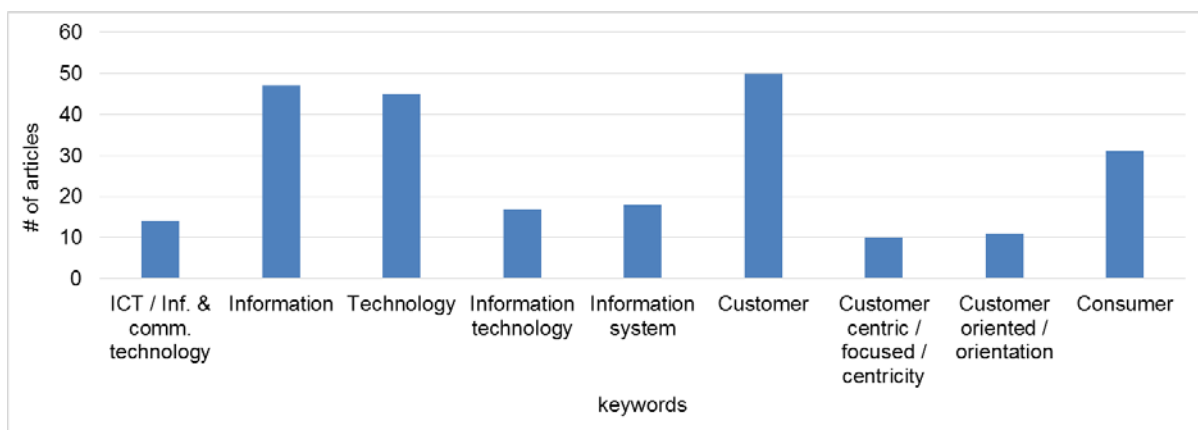


Figure 1. Amount of articles with the instance of particular keywords

Figure 2 shows 50 most cited selected articles in terms of where they were published or presented. The most frequent journals were in this case The Industrial Marketing Management, The Journal of Cleaner Production and The Service Industries Journal.

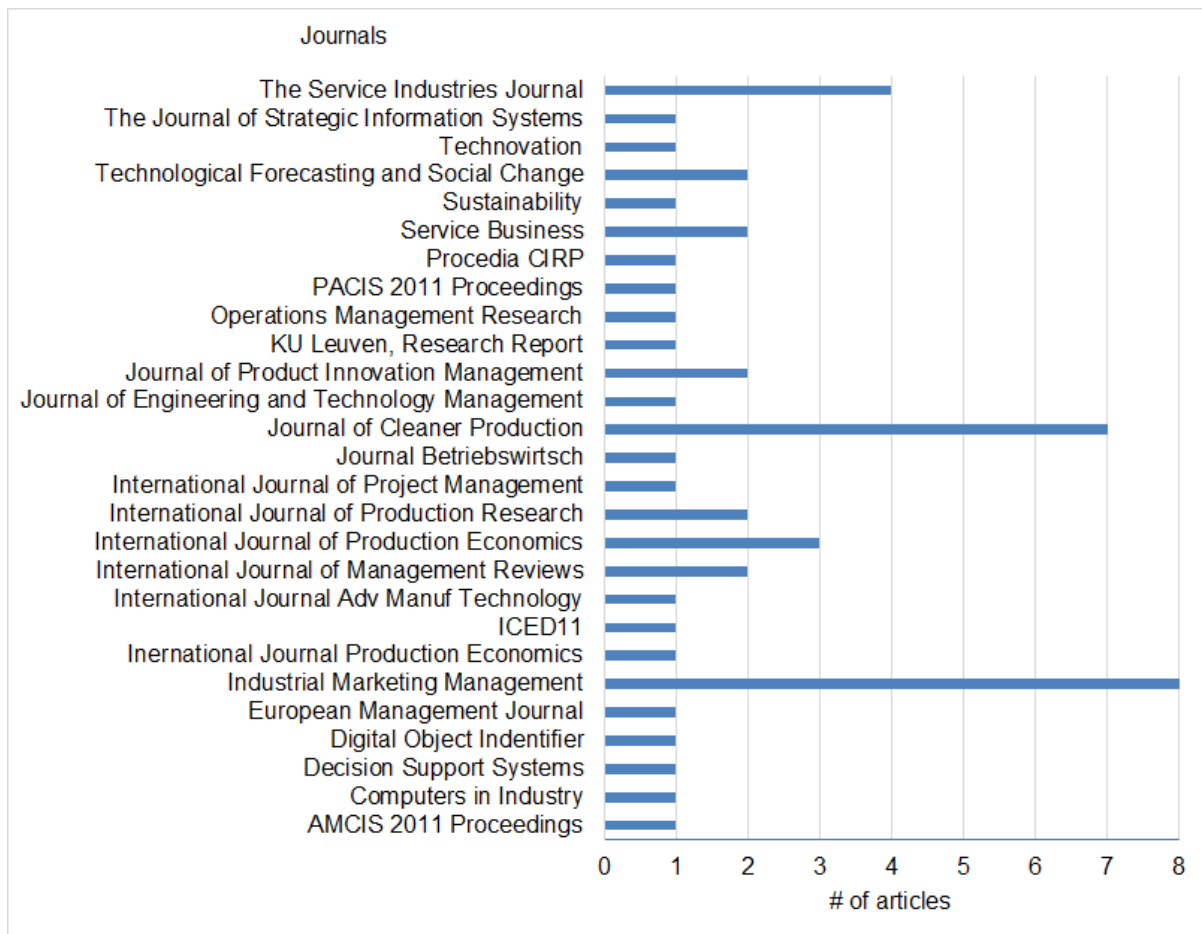


Figure 2. Number of analysed articles per journal

1.2. Deep analysis

On the top of a simple reference collection and search for keywords in the text of selected articles, we have done more detailed analysis of their content. The goal of this deep analysis all selected articles is to identify relationships between specified concepts:

service development & customer & information & ICT/IS/IT

From obtained results we can see that although term “ICT” is widely used term in the servitization, only 14 times (28%) was directly mentioned in analysed articles. When analysing a combination of terms ICT & IT & IS we can observe that as minimum one of these three terms exists in 30 articles what represent 60%. Similar situation is with phrases “customer centric” and “customer oriented/orientation”. As minimum one of these two phrases exists in 18 articles (36%).

Practically all articles highlight role of information in service development process and in the servitization as whole. The information technologies became an integral

element of 21st century consumer experiences (Baron et al., 2014). Technology plays a crucial role in the service development nowadays (Park et al., 2012).

For first stages of the service development is important to set up process of assessment customer perceived value to meet a customer's business needs and to be customer centric (Cavalieri and Pezzotta, 2012), (Macdonald et al., 2011), (Sojung and Yoon, 2012). In addition, there is an idea to include the customer as an input in the production function (Djellal and Gallouj, 2013), (Raja et al., 2013). To obtain clear customer requirements is a complex process requiring a lot of experience. These activities are often supported by specialized IT tools (Lee et al., 2013)). Such tools usually provide additional useful capabilities such as mapping customer requirements, service attributes to determine a priority based on the customer orientation, Product Lifecycle Management systems, and applications to process of information feedback (Tukker, 2013). The next common idea expressed in many of analysed articles is the importance of usage IT solutions for listening to the 'voice of the customer' and for product distribution (Belvedere et al., 2013), especially because the identification of customer needs is an essential part of the service development (Lim et al., 2012), (Meier et al., 2011), (Raja et al., 2013), (Sojung and Yoon, 2012).

To be able to meet customer needs, first the relevant information have to be collected. Gathering customer information is complex process which is unimaginable without of ICTs (de Jong and Vermeulen, 2003). Sometimes, it is useful to gather information directly from citizens (Lee et al., 2013) or observe behaviour and habits of customers (Reim et al., 2015). It is necessary to point out not all companies are able effectively utilize collected information (Barquet et al., 2013).

There are different ways of acquiring customer information (Turunen and Toivonen, 2011). Information gathering from different customers can be anonymised and generally used (Kujala et al., 2013). Most frequently, different types of questionnaires and feedback mechanisms are used (Turunen and Toivonen, 2011), (Phumbua and Tjahjono, 2012). Interactive web form can be amended by text analytics capabilities (Molnár et al., 2014). Such solutions often help the customer to find relevant information promptly and increase of her/his satisfaction at the same time.

One of key drivers of service innovation are IT and collaborative communication with customer (Santamaría et al., 2012). Another work suggests intense interactions with customers and increased service levels can affect characteristics of the Product-service systems (Phumbua and Tjahjono, 2012).

This is enhanced when there is offered "integrated combinations of products and services that meet specific demands of customers" (Velamuri et al., 2011). Service provider needs to be informed how customers use their product, what difficulties they meet, what is the condition of using the product, and what is the relationship between the core product and related products (He and Lai, 2012). A very important is specify contemporary issues related to service research (Baron et al., 2014).

The requirements collection, follows an evaluation phase when requirements are evaluated from both formal and business sides (Tukker, 2013). An important part of requirement management is sharing gathered information (Beuren et al., 2013), (Macdonald et al., 2011), (Reim et al., 2015) what is also relevant for service supply chain (Finne et al., 2013).

A very important part is played by the customer satisfaction, especially in the service delivery stage (Beuren et al., 2013), (Boehm and Thomas, 2013), (Candi et al., 2013), (Kastalli et al.2013), (Pardo et al.. 2012), (Saccani et al., 2014). There are cases when customers are willing to pay a premium, which reflects the added value of satisfaction that usually arises from service personalization (Gaiardelli et al., 2014), (Zhen, 2012). Often it is the information system as business supporter, which adds the main value to provided service (Pardo et al., 2012).

Although findings of this literature review confirmed irreplaceable role of the ICT in service development, necessity of automatic processing the customer needs (demands, requirements) by the utilization of specific tools with original capabilities is not clearly specified. In the next section we have processed another portion of selected literature directly related to ICT in service development with a goal to specify requirements for ICT capabilities as accurately as possible, enabling us to propose the framework for such tools.

2. Service Development – an Information view

2.1. Service development and ICT

Developing new services has become crucial for many service providers including servitizing organizations. Major part of them implement a rule saying by Edvardsson and Olsson that the customer is a co-producer of the service has wide-reaching implications to new service development (Edvardsson and Olsson, 1996).

When manufacturer introduces a new service he is in a new position. According to the (Edvardsson and Olsson, 1996), services are much more dependent on ICT as products. The role of ICT is significantly higher and ICT enables the increase of the efficiency of communication, co-operation and interaction. This happens both inside of the project team and also with customer. ICT capabilities therefore support the development of new services (Bullinger et al., 2003). The important role in service development is played by the front office. The front office personnel represents an essential part of service development team. In the first line, they can acquire valuable insights on customer needs and match it with what company offers (Alam, 2006).

The key aspect of the new service development is the orientation on customer needs, which is especially important when developing the service by alliance (Valkeapää et al., 2006). The following requirements on ICT capabilities used during service development process can be identified: 1) interaction with customers must be allowed for service developers and customer servants, 2) to collect, store and process the content of the interaction, 3) to allow to execute the market research and observation, and 4) to acquire the knowledge about customer needs (Valkeapää et al., 2006).

According to Shekar (Shekar, 2007) Service development stages are 1) Problem Identification, 2) Idea Generation, 3) Concept Development and Evaluation, 4) Business Analysis, 5) Development and Testing, 6) Market Testing, 7) Commercialisation, and 8) Post evaluation. From the point of the quality of service and hence the customer satisfaction it is the most important to analyse and evaluate a customer satisfaction surveys collected during the last stage of service development process.

Another approach is also presented by (Shekar, 2007) who points out the „Customer is part of the production phase“.

Nowadays, customers express their experience and needs via a number of channels (including social media, discussions, blogs etc.). To automate this process, it is necessary to identify and utilize related ICT capabilities systematically. Another challenge are activities banded with study and analysis of gathered information. In order to analyse unstructured data from customers, the Text Analytics and NLP capabilities are required to be implemented by the company. Companies with such capabilities dramatically improve their customer relationship, enhance customer experience and enable more informed service development.

The customer communication can be massively supported by new capabilities of ICT (Molnár et al., 2015). In addition communication with customer is getting very important tool for improving of customer satisfaction with a possibilities targeted leverage on customer. (Posselt and Förstl, 2011) defines “a supportive culture as a construct of complementary dimensions consisting of innovative supportive culture, market orientation culture, learning culture, and customer communication culture.”

(Belvedere et al., 2013) describes and demonstrates the essence of the impact of ICT on value creation in servitizing organization. They highlight “superior responsiveness of operating processes” and “improvements in the product offering”. In addition, it is claimed that a new product development is more powerful when utilizing new decision support systems “with better support for the decision-making process”.

Orme (Orme, 2014) points that the most important for service is the integration of new ICT systems with existing business systems and establishing a 360-degree view of a customer. He adds new position for servitizing organization it is the position of the service provider which is required not only to provide service but also to keep required service quality including service reliability and relationship with customers.

ICT provides not only the support for the employees of the company but also useful insights on customer opinions and their needs. In (Bains and Lightfoot, 2013) are specified extended ICT capabilities into five functions applicable for advanced services: 1) Monitor, 2) Transmit, 3) Store, 4) Analyse, and 5) Respond.

The most important flow of Data for servitizing company is data from sensors (often thousands). Bains & Lightfoot (Bains and Lightfoot, 2013) introduce that “advanced services frequently require a wide portfolio of additional data” which is transmitted to the manufacturer. Another important part of data flows in Servitization is customer feedback which is mainly used to improve of Manufacturer’s operation but is a valuable source of information for service development and improvement as well.

Sanders et al mention the first three steps of service research and development process (“generating an idea for a product or services, gathering and synthesizing information on the idea, and designing the product or services”) are directly connected with the utilization of ICT (Sanders, 2012). A very important part of these service development’ activities is learning-about or search process (Sanders, 2012) which represents search and synthesis with the goal “to gain insight and understand the potential of an emerging technology or a new idea”.

2.2. Requested ICT capabilities

The companies could profit from a capability to collect and analyse data and use it to improve key features of their service development – strong customer orientation. Besides, understanding of the human-generated information including feeling or sentiment, requires a fundamentally new approach that uses technology to deliver insight, ideas, and intuition into the rapidly growing and diverse data that we deal with every day. This approach takes all processed data and evaluates its meaning within the context of the entire knowledge pool (Molnár et al., 2014). This is a successfully story of Rolls Royce which has leveraged digital innovations around analytics and the “Internet of Things.” (Barrett et al., 2015).

Service innovation is closely related with ICTs (Barras, 1986). In these traditional approaches to the utilization of ICTs within service innovation process (Baines and Howard, 2013). ICTs have been understood as sophisticated tools which contribute to increasing of productivity and efficiency of service delivery process. Against those perspectives, there are new views on ITC's role in service innovation (Lusch and Vargo 2014). These underline the importance ICT and assign it directly into resources for service innovation.

(Barrett et al., 2015) suggests “that service innovation is a critical area for Information System research contribution to knowledge.” In addition (Barrett et al., 2015) claims that information should be placed at the centre of service innovation and knowledge is its “key operant resources”.

Often the changes in ICTs are related to service innovation recognized implicitly instead of explicit manner (Barrett et al., 2015).

Based on the previous and this section of our paper, we can clearly identify following key findings in existing literature:

- The importance of customer orientation and interaction was confirmed by literature review of articles related to the Service Development. From this point we can conclude: customer communicate via several different channels directly with the organization or indirectly posting his/her message on web (pages, blogs, discussions, social media...).
- There is a gap between the traditional perception of ICT's utilization within servitizing organizations and real needs of the business of these companies (unstructured data processing). This implies Big Data technologies enhanced by Text mining, NLP, Analytics and Knowledge Management are key ICT needed by those organizations.

These findings accompanies the development of knowledge based systems with strong focus on Text Analytics and NLP capabilities. Utilization of these capabilities allows organizations to obtain insight from gathering unstructured data from customers or potential customers. It allows companies to keep focus on customer centric service development. In order to achieve that, organizations have to implement a complex knowledge based solution.

3. Our Approach

Customer centric (oriented) service development supposes to process unstructured mainly textual data. It is also a common practice companies want to track their customers through their lifecycle. The retrieval and analysis of unstructured textual data is a big challenge for companies. According to Miner (Miner, 2012) “Text mining and text analytics are broad umbrella terms describing a range of technologies for analysing and pro-cessing semistructured and unstructured text data.”, they also split text mining into seven areas: 1) Search and information retrieval, 2) Document clustering, 3) Document classification, 4) Web mining, 5) Information extraction, 6) Natural language processing, and 7) Concept extraction.

We propose the architecture combining several of these areas, first we need the search and information retrieval in order to get raw information from customer, than we use the natural language processing and information extraction and concept extraction to extract all relevant information from it. Then we visualize the data. This architecture can be then easily utilized for the service improvement. Company can monitor and track how customers react on a number of aspects of their services and any changes made to them. Company can also identify and fix weak spots of their services using data from customers.

In this chapter we first theoretically introduce the information and knowledge, then we propose the architecture for information retrieval and processing and then we illustrate the architecture on a particular example.

3.1. Information and Knowledge

The usual form of the communication between the organization and its customers is “Information - Information”, where customers supply some information and company replies with another information. These interactions are important and often recorded by the company (for example calls on the customer service line). Another form of the communication is “Data - Information”, where customer provides or publishes some unstructured data and the aim of the company is to respond as promptly and as accurately as possible in order to satisfy him. The example of latter are customer reviews on specialized websites.

We propose the architecture with the ability to understand different inputs from customers and automatically accumulate and report the knowledge and the information contained there. This way company can provide better and timely response to customers, but what is more important, it can use accumulated knowledge for the service development and improvement. In this case the communication becomes “Information – Knowledge - Information” and the Knowledge base is used for the service development. Whole process is described in the Figure 3.

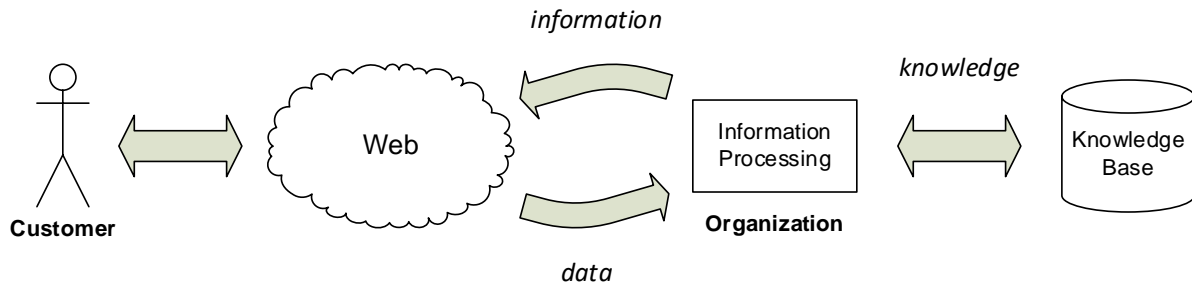


Figure 3: The Data – Information – Knowledge Flow

Traditional information flow is direct from the customer to the company. It is then recognized by the company on a certain level, but a large part of the information available on the internet would remain unknown. In these settings the company does not have all relevant information to improve or alter their services. We propose a model in which company retrieves the information from both, the communication with customers and internet, and creates the knowledge base. The knowledge base can be then used to improve the communication with customers and more importantly to improve existing services, or create new services.

3.2. Proposed architecture

In order to implement the Knowledge base (and/or the “Information – Knowledge – Information” communication), a company has to be able to retrieve, process and understand a large quantities of unstructured data. We propose a following model enabling company to cope with these requirements (as shown in Figure 4):

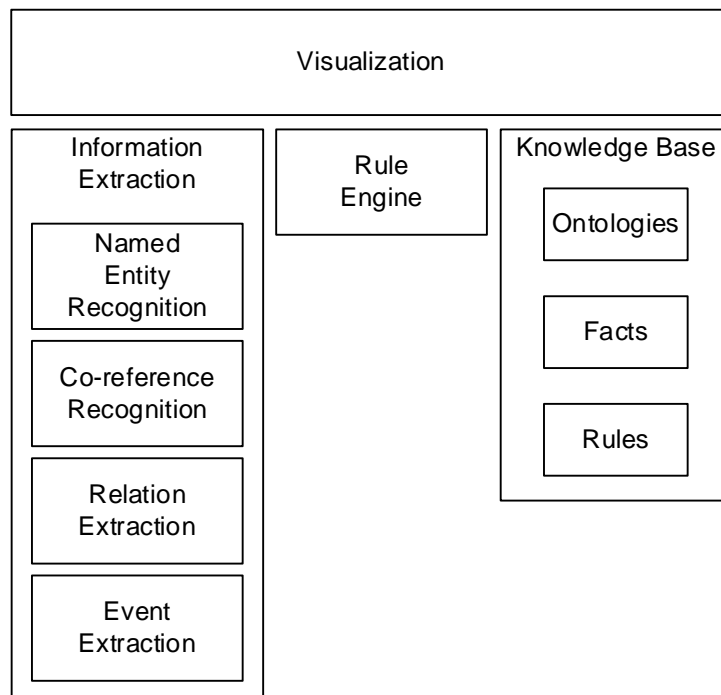


Figure 4: The functional blocks of proposed Knowledge-Based System

Proposed system uses unstructured data as the input, then it extracts the information from them using the rule engine. The main parts of this solution are Knowledge based represented by lightweight ontology and facts enrolled in POSL (POSL – Positional Slotted Language), Rule based system and the Reasoning engine. We also propose the use of retrieved data in order to provide more insights using the visualization in order to display the comprehensive information more clearly to the company and employees.

The input of this system is raw text, it is downloaded from the internet and other sources for example from the customer-company email communication. Raw information is then processed using the information extraction system. This system performs also, among other tasks, the entity recognition and relation extraction. Please refer to (Cowie and Lehnert, 1996) or (Piskorski and Yangarber, 2013) for more information about the information extraction. How are the information extraction systems implemented for web is described in (Chang et al., 2006).

After the information extraction step is the information passed to the rules engine. This engine uses a set of pre-defined rules to process these information and extract structures (or items). Examples of rule based systems are (Skeppstedt et al., 2012) who used it for the entity recognition in health records or (Folorunso et al., 2012) who used it for mineral identification. All structured data (items) as well as other information (for example ontologies and rules) are stored in the knowledge base. They are then retrieved and visualised as needed. An example of this system is a system visualising the most important issues customers create information about and what their attitude is. Such system is then used by the customer care and product departments in order to improve existing or create a new product. Another example would be an autonomic responding system that automatically responds on customer queries (for example online and e-mail support).

3.3. Example

Here we present an example of proposed architecture and its application for the service development and service improvement. The example is textual customer review of the service, which is publicly available on a specialized website. Using proposed architecture, the review is retrieved as a raw text, then processed and visualized in order to enable the company to act on it.

Example customer review goes as:

"We were planning to migrate to XY's cloud, we have tried to contact them 5 times but they never contact us back. We used the form in their webpage, we have received an email that said that customer care should be in touch with us in the next 24 hours but they never called us. They do not offer chat assistance or telephone assistance. They have very serious problems in this area as they have lost a big client and they do not even know."

Parsed, but still raw text is processed and displayed following the approach described in the previous sub-chapter. First is the text split to sentences and then the topics of individual items (sentences) are identified using pre-defined set of rules. On the top of that, the sentiment analysis is performed to reveal the attitude of customer. The last step is the visualization of retrieved data using dashboards. It is crucial to

display the data in a correct way in order to make it clearly visible for company to act based on them.

The example of how is the text split into sentences and sentences analysed is shown in the Table 2. You can see the information extraction module of our architecture split the text to sentences and calculate the sentiment.

Raw sentences:	Sentiment:
said that customer care should be in touch with us in the next 24 hours	0.718
they have lost a big client and they do not even know	-0.647
We were planning to migrate to XY's cloud	0

Table 2: Raw sentences and identified sentiment¹

This provides some insight on what is expressed in the text, however it does not identify to what are these sentences related (topic identification). While it does not matter for relatively small amounts of data, should there be hundreds of texts and thousands of sentences, it would be hard to extract any insight without the topic identification and clustering sentences to similar topics. We proposed to use the rule engine² and pre-defined set of rules to identify topics in individual sentences. The example of structures extracted from sentences using the rule engine is shown in the Table 3.

Raw sentence:	Identified structure:
said that customer care should be in touch with us in the next 24 hours	CONTENT (of CONTACT) WHO = company WHAT = contact client WHEN = in 1 day
they have lost a big client and they do not even know	ATTITUDE WHO = company WHOM = client WHAT = lost WHEN = past
We were planning to migrate to XY's cloud	MIGRATE WHO = client FROM = ? TO = cloud WHEN = past

Table 3: Raw sentences and related identified structures

¹ The sentiment was identified using HP Idol available at: <http://www.idolondemand.com/>

² For more information on rule-based systems please refer to (Buchanan and Shortliffe, 1984)

As it is visible in the Table 3, once raw and unstructured text becomes structured. These structures are then stored in the knowledge base and used for different visualizations and reports.

Processed data are visualized using the combination of visualization techniques. A nice review of different visualization techniques was created by (Kucher and Kerren, 2014) and the overview of more than 200 methods is available at <http://textvis.lnu.se/>. Our visualization methods are based on the combination of BLEWS method by (Gamon et al., 2008), LDAExplore method by (Ganesan et al., 2015) and ShakerVis method by (Geng et al., 2013). Our goal was to display information retrieved from different sources, parsed into text and then analysed into meaningful dashboards to enable company's employees to act on these information.

Figures 5a through 5d show all visualization screens, on the first screen there is a complete overview of all company's services, number of identified items and overall sentiment. Services are then sorted from lowest sentiment. Second screen provides more detailed view as it shows number of items and their sentiment per topic. In our case all 9 items identified from the review were related to the customer support. Third picture shows even greater detail that reveals 8 items were from the Interaction topic and one was Complaints, in this case are individual topics sorted by number of items. The last picture shows Interactions topic, to be precise Interactions with Customer support related to the cloud service of the company. In this view it is possible to spot trends in number of items and overall sentiment (upper part of the Figure 5d), this enables to observe how customers communicate about an particular topic (in this case Interactions of the Customer support). Bottom part of the last view displays whole user's text with highlighted items and coloured by the sentiment and individual items related to given user's text.

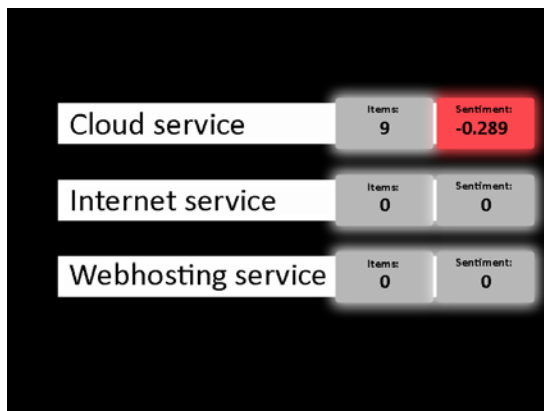


Figure 5a: Home page with all services



Figure 5b: Details of the Cloud Service

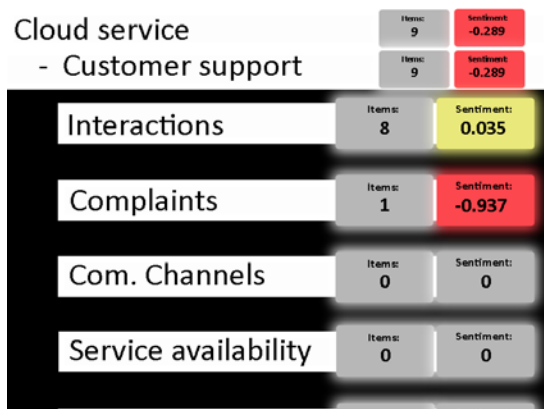


Figure 5c: Details for the Customer support of the Cloud Service

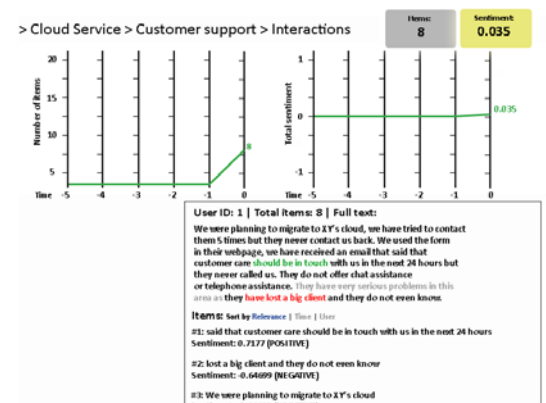


Figure 5d: Detailed view with individual items for Interactions with Customer support

Visualizations, similar to one presented above are crucial tools for the interpretation of retrieved and analysed information. Companies can utilize them for the improvement of their services. They can simply implement changes and then see the reaction of customers on the internet and in the communication with the company in several, clear and straight dashboards without any need to go through thousands of documents.

4. Conclusion

In this research we present a model of the knowledge-based system for the evaluation and analysis of company's services. The system collects, processes and displays unstructured, customer-created data. Conceptually this system utilizes the information extraction base on the rules and knowledge management. It helps to understand what are customers saying and it reveals patterns in their opinions. This enables company to see not only the communication with customers but also information available via public sources. Clear and simple visualization system helps to present processed information in a meaningful way, enabling company to act prompt-

ly on any issues raised about their services. Moreover, this tool can be utilized to analyse products and services of competitors as well.

Unstructured data are more and more important and customers are producing more and more information and express their opinions on services they use. This implies the architecture similar to proposed will become a crucial tool for the service development for any company.

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I5: Collaborative potentials of ICT

Chair: Iwona Windekilde

Transaction costs and the sharing economy

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The paper discusses the so-called sharing economy from an industrial structure perspective. The illustrative cases examined are Airbnb and Uber. The research question raised is concerned with the extent to which transaction cost theory can be used to explain the changing industrial structures in the application areas that the Internet-based platforms are addressing and how other theoretical frameworks can be helpful in understanding these developments. The paper concludes by proposing a theoretical framework for analyzing the structural implications of the sharing economy based on theories on multi-sided platforms, transaction costs, and substitution and complementation.

1. Introduction

During the past couple of decades, a wide variety of Internet-based platforms have sprung up – some of them extremely successful. eBay is a prominent example of one of the platforms established before the dotcom crash. Airbnb (accommodation) and Uber (transportation) are successful examples of platforms established during the past 5-10 years. Airbnb and Uber are seen as examples of the emergence of a sharing economy (Hamari, et al., 2013), (Zervas & Byers, 2013) where people share human and physical resources. Indeed, sharing includes many different forms of activities – some of which are non-commercial and others commercial. The paper examines the commercial kinds of developments and discusses the possible foundations and implications in terms of economic reasons and industrial structures. The research question is concerned with the extent to which transaction cost theory can be used to explain the changing industrial structures in the application areas that the Internet-based platforms are addressing and how other theoretical frameworks can be helpful in understanding these developments.

The obvious explanatory framework is transaction cost theory taking its point of departure in Ronald Coase's seminal paper from 1937, as the digital platforms allow for decreasing transaction costs – in the eBay case between sellers and buyers of all the items and services sold via eBay; in the Airbnb case, between those offering and those buying accommodation; in the Uber case, between those offering and buying transportation. Without the digital platforms, the transaction costs of searching, contacting, contracting, etc. would generally be much too high for such commercial markets to develop. However, this obvious explanatory framework has only been little elaborated upon academically and analytically (Benkler, 2004). The aim of this paper is, therefore, to take a more analytical approach, using a transaction cost framework for examining prominent examples of the sharing economy. The examples examined are Airbnb and Uber.

In 1937, Coase had his paper entitled 'The Nature of the Firm' (Coase, 1937) published, which presented the basics of the transaction cost approach, and he used it

as a theoretical framework for explaining industrial structures. Basically, he used transaction costs as the explanation for the existence of firms: Were there no costs of transacting between the agents in markets, the structure of industries would be composed of individuals (or only very small companies). The explanation for larger companies to be created is the existence of transaction costs, which can be minimized by the establishment of larger entities, is the argument in the Coase paper. The 1937 paper is, in a sense, a position paper, where Coase boldly advances transaction costs as the primary basis for industrial structures with large companies. He even discards other explanations, for instance the divisions of labor and the specialization efficiency effects. The goal was to put transaction costs on the agenda of studies of industrial structures.

In the present paper, the transaction cost approach is seen as a crucial element in explaining the development of sharing on a mass-scale. However, this approach cannot stand on its own. It does, for instance, not explain the limits of the encroachment of sharing-services on established markets (e.g. hoteling and taxi driving). It actually does, in an inverse manner, contribute to explaining the establishment of new large companies in the Internet world. There have always been companies that live on transaction costs. Business lawyers are good examples, as their function is to see to the contracting and enforcement of business agreements. So are real estate brokers, establishing the connections between the sellers and buyers of real estate property. But the Internet has created a foundation for a large variety of new businesses that live on providing services lowering transaction costs. It may be that some of the explanatory frameworks that Coase discarded so quickly and other theoretical frameworks can offer elements of explanations for the structure of market developments.

In the paper, case analyses of the new Internet-based platform services, exemplified by Airbnb and Uber, are provided as well as an analysis of the implications for the markets they are addressing. This analysis will be used for discussing theoretical approaches that are needed in order to explain these developments. First, the paper examines the concept of sharing and its different forms. This is followed by a theory section, where Coase's approach to transaction costs and ideas on substitution are presented. Thereafter, an overview of the different types of Internet-based platforms is put forward, followed by case analyses of Airbnb and Uber. Before the conclusion, implications for theory and analysis are discussed.

2. Review of literature on sharing economy

Going back to collaborative consumption (1978)

The sharing economy concept is said to build on the concept of collaborative consumption (Hamari, et al., 2013). Actually, the concept of collaborative consumption, as it was first put forward by Felson and Spaeth (Felson & Spaeth, 1978) had a different meaning, namely 'events in which one or more persons consume economic goods or services in the process of engaging in joint activities' (Felson & Spaeth, 1978). The examples were 'drinking beer with friends, eating meals with relatives', etc. (Felson & Spaeth, 1978).

From 1978 until 2007, there were only few publications on collaborative consumption within the context of sharing or renting goods. In 2007, Russell Belk described sharing as an alternative form of distribution to commodity exchange and gift giving. The author pointed out that sharing can foster community, save resources, and create certain synergies. His article addresses impediments to sharing as well as incentives that may encourage more sharing of both tangible and intangible goods (Belk, 2007).

In subsequent publications, Belk provides an extensive theoretical review of the concept of sharing and distinguishes 'sharing in' and 'sharing out' in terms of gift giving and exchange. He suggests that 'sharing in' dissolves interpersonal boundaries posed by materialism and possession attachment through expanding the aggregate extended self. However, such sharing is challenged by growing market commoditization (Belk, 2010).

In 2014, Belk published a paper, 'You are what you can access: Sharing and collaborative consumption online', where he pointed out that "sharing is a phenomenon as old as human kind, while collaborative consumption and the sharing economy are phenomena born of the Internet age". He concluded his paper by the modifying the former wisdom, 'You are what you own', converting it to a new wisdom, 'You are what you share', indicating that we just may be entering the post-ownership economy (Belk, 2014).

Furthermore, Rachel Botsman and Roo Rogers have redefined collaborative consumption as an activity which 'is enabling people to realise the enormous benefits of access to products and services over ownership, and at the same time save money, space, and time; make new friends; and become active citizens again' (Botsman & Rogers, 2010).

Some people make allusions to transaction costs

Relatively few papers have studied transaction cost aspects of the sharing economy. Yochai Benkler in his essay 'Sharing Nicely' (Benkler, 2004) seeks to define a particular class of physical goods as 'shareable goods' that systematically have excess capacity, and to combine comparative transaction cost and motivation analysis to suggest that this excess capacity may better be harnessed through sharing relations than through secondary markets.

Benkler pointed out that the primary systematic differences between the transaction costs of markets and sharing are related to information and enforcement costs. 'Markets use a combination of the price system and managerial hierarchical reporting and command flows to manage information about the universe of potential actions on resources in the world. Social frameworks use social cues that are usually less formal and less focused on crisply delineating the alternative courses of action open to participants in these frameworks' (Benkler, 2004). In regards to enforcement cost he emphasize that 'markets rely more heavily (though not exclusively) on formal enforcement, while social relations rely on informal enforcement mechanisms studied in the literature on social norms and reciprocity'.

Discussions regarding non-profit and for-profit sharing

There is also a discussion regarding non-profit and for-profit sharing – that the new for-profit sharing encroaches on already existing non-profit sharing. This consideration corresponds to the rise of numerous for-profit and non-profit activities that are booming thanks to the rise of the sharing economy, for example Airbnb and Uber.

Neal Gorenflo (Gorenflo, 2013) talks about how money is ruining what started out as a transformative concept. In his post, he emphasizes that collaborative consumption is suffering growing pains. 'As collaborative consumption goes mainstream, it risks losing the very thing that attracted people in the first place, the unique and even transformative social experiences made possible when you interact with helpful strangers' (Gorenflo, 2013). He stresses that with this potential loss goes an important part of the positive impact of non-profit sharing. Erin Griffith (Griffith, 2013) has a similar point of view. She provides examples of Airbnb, which basically took the model of Couchsurfing and turned it into a for-profit enterprise, and car sharing which is just a more organized car-pooling. She argues that a transaction that involves money is not actually sharing, its renting or selling. At the same time, alternative approaches rise. Juliet B. Schor (Schor, 2014) points out that while the for-profit companies may be 'acting badly', these new technologies facilitating peer-to-peer economic activity are potentially powerful tools for building a social movement centered on genuine practices of sharing and cooperation in the production and consumption of goods and services. But achieving that potential will require democratizing the ownership and governance of the platforms. Erin Griffith (Griffith, 2013) admits that without money many sharing economy sites would not have gotten to the size they are today. 'The sites required money to offer services that are effective and, as a result, their services have impacted more people than they might have otherwise. That's how, in most cases, for-profit sharing economy companies have outgrown their free counterparts' (Griffith, 2013).

Similarly, there is a discussion regarding how sharing affects users' protection but also workers' rights

New platforms such as Uber and Airbnb have drawn significant criticism from established operators and concerns from governments about fair competition, workers' rights and consumer protection. Brishen Rogers in his research focuses on the relationship between employment regulations and liberal distributive justice and on the influence of information technology on the world of low-wage work. In his paper, 'The Social Costs of Uber', Brishen (2015) pointed out that 'Uber's longer-term impact on labor standards is quite unclear, however, and it may have dark implications for the future of low-wage work more generally'. He assesses Uber's effects on safety, privacy, discrimination, and labor standards and outlines how law makers might adapt existing laws to reach Uber and other ride-sharing companies.

The sharing economy is also a result of the economic crisis, where people lose their jobs and need to find other means of income

The macro-economic factors seem to play an important role in driving the growth of the sharing economy. Many researchers point out that the new trend towards collaborative consumption started to gain momentum as a response to the global financial crisis and an attempt to fight over consumption. According to the European Economic and Social Committee (EESC) (EU, 2014), a consultative body of the EU, collaborative consumption, such as car sharing, room rental, and digital communities for learning languages, represents great alternatives in times of crisis. Many believe that the sharing economy is an appealing alternative for consumers due to its economic benefits (i.e., low cost, new income opportunities), which have been considered important following the global economic crisis. It is also suggested that collaborative consumption will continue to grow even when the economy is fully recovered (Bardhi & Eckhardt, 2012), (Walsh, 2011), (EU, 2014).

But first and foremost, sharing has always existed, but technology provides a new platform

The Internet has made it much easier for people to connect with one another and to coordinate their activities. People use platforms to rent, sell, or share things with others. It is an obvious approach and many researchers suggest the importance of digital technologies, facilitating the emergence of the sharing economy in overcoming the transaction costs, the trust and reputational barriers that once restricted sharing activities (Schor, et al., 2015), (Stokes, et al., 2014), (Benkler, 2004), (Forum, 2014).

3. Transaction cost theory and theory on substitution

In the present paper, theory on transaction costs is the basic explanatory framework for understanding the development of services like Airbnb and Uber. However, in order to understand the potentials for the costs of transaction to have an influence on the use of the new Internet-based platforms, the degrees of substitutability between traditional services and the new services have to be discussed. Two different but interrelated frameworks will briefly be dealt with: Transaction cost theory and the issue of substitution.

Transaction cost theory was first presented in a succinct manner by Ronald Coase in his 1937 paper, 'The Nature of the Firm' (Coase, 1973). In the basic assumptions in neo-classical economics, there is full information for all economic agents in all markets, and the only costs to be considered are the costs of production and transportation. There are no transaction costs, as all economic agents are fully informed of qualities and prices of all products and of all production and consumption possibilities.

What Coase did was to modify this assumption by including the real-world view that economic agents have only limited information, and that there are many costs associated with transacting in markets. This realistic view has a host of different implications for how markets work, however, Coase wanted to put emphasis on its implications for industrial organization. He used it for explaining why we have firms, where many people co-operate in smaller or larger entities in the production and marketing processes, and not only a vast array of individual economic agents transacting with one another. The reason he indicated was that because of the many different costs of transactions, economic agents would join up and create larger economic entities in order to lower transaction costs. However, he recognized that there are also costs of managing companies (internal transaction costs), but that the external transaction costs are powerful economic mechanisms that lead to the establishment of firms.

These initial ideas on transaction costs were later further developed, first and foremost, by Oliver Williamson (Williamson, 1979), (Williamson, 1981). Building partly on Herbert Simon's bounded rationality concept (Simon, 1957), Williamson developed a framework for understanding transaction costs including the concepts of bounded rationality, uncertainty, opportunism, asset specificity, and transaction frequency. These are the kinds of factors that create transaction costs in the economy: The fact that there is uncertainty in markets and that all economic agents have bounded rationality and act opportunistically, and that assets to a large extent are specific and that transactions may take place more or less frequently will create transaction costs.

Similar ideas and concepts are relevant for the discussions on substitution. In basic neo-classical economics, taking the foundational assumptions for granted, there is in principle full substitution between all products and services to the extent that different bundles of products and services can deliver utility to the users in ways that may satisfy the needs of users in similar manners. In reality, substitution is discussed in relation to products and services that fulfill comparable needs of users. In our examples, hotels and private accommodation both deliver accommodation services, and taxis and private transportation both deliver transportation services. The discussion is the extent to which the different services are fully substitutable. Is there full substitution between hotels and private accommodation and between taxis and private transportation?

The answer to these questions can build on, e.g., a value proposition approach and an approach that takes into account the different reasons for transaction costs and the different elements in the business processes, where there are transaction costs. In a value proposition approach it will be discussed what the different elements in the value propositions of the different services are. A hotel stay, for instance, offers a room and bed at some known standard quality (in most cases), solitude, several rooms at the same time if being a group of people, breakfast, etc. Private accommodation via Airbnb offers a room and bed at more unknown standards, the chance of meeting new people, etc. The value propositions are to a large extent similar, but also differ at some points.

If looking at the issue from the point of view of the reasons behind transaction costs and the processes of transaction, uncertainty, bounded rationality, and opportunism may play a role, as the service users will have less knowledge on the services provided because of the lower degree of standardization. The processes of searching, contacting, contracting, etc. would previously be much more difficult for private accommodation and transportation than for hotels and taxis. However, this is exactly where the new digital platforms come in and change the basic conditions for substitution. When it becomes easy to search for the right place or the right means of transportation, to contact and to contract for getting access to the services, the degree of substitution will increase. The potential substitutability between services becomes a real possibility for substitution.

4. Internet based platforms

With the diffusion of the World Wide Web from the mid-1990s, an interest in categorizing the different types of new Internet-based business models was initiated. One of the first most cited contributions at the time was the paper 'Business models for electronic market' by Paul Timmers (Timmers, 1998). Another important contribution was the website maintained by Michael Rappa (Rappa, 2010), which included a taxonomical categorization of 'Business models on the Web'. This taxonomy included the following business model categories: Brokerage, advertising, infomediary, merchant, manufacturer, affiliate, community, subscription, and utility.

Later, during the first years of the new millennium, came an increasing interest in ontologies of business models, i.e. the interplay between the different elements of business models including the technological, organizational etc. aspects. One of the major contributions in this field came from ICT researchers from the Netherlands and

Belgium, see, e.g. Faber et al. (2003), 'Designing business models for mobile ICT services'. Other major contributions came from Alexander Osterwalder and Yves Pigneur, with Osterwalder's doctoral thesis, 'The business model ontology', (Osterwalder, 2004) as an important landmark.

The development of science in this field thus follows the traditional path from taxonomies to ontologies – and back again with more specified taxonomies on the basis of increased knowledge on the interplay between the different elements and facets of business models. The interest in the present paper is on a type of brokerage model that not only has become the object of steeply increasing research attention during the past decade (Rochet & Tirole, 2006); (Gawer & Cusamano, 2002); (Hagiu & Wright, 2011), but also has spread quickly in actual business developments, namely multi-sided platforms (MSPs).

The MSP concept is an extension of the two-sided market concept (Rochet & Tirole, 2006) with more than two different kinds of customers, who are interdependent and are being served by the same platform. In a paper by Hagiu and Wright (2011), they differentiate between MSPs, re-sellers and input suppliers, where MSPs are distinguished by the direct interaction between the different customer groups. In the two cases analyzed in the present paper, Airbnb organizes the direct interaction between accommodation providers and users and Uber organizes the direct interaction between transportation providers and users. Airbnb and Uber are thus basically two-sided markets - which may be further developed into multi-sided platforms with, for instance, advertisers as a third kind of platform customers, if considered strategically desirable by the platform owners.

Airbnb and Uber are certainly not the first Internet-based platforms in the accommodation and transportation areas. Other commercial as well as non-commercial platforms have preceded them. In as well the accommodation and the transportation areas, there are many non-commercial platforms, where people can find free accommodation and transportation. These kinds of arrangements have contributed to the air of sharing, which the commercial platforms build upon. However, while the non-commercial platforms are altruistic sharing platforms, the commercial platforms are 'in it for the money' both with respect to the revenue derived by the platform owners and the payments to the accommodation and transportation providers.

Other commercial platforms have also existed before the large international ones with Airbnb and Uber as the archetypes. Renting of accommodation, especially vacation accommodation, via agencies has been taking place for a very long time. Internet has certainly provided such commercial operations with a new and much more efficient platform but has, in many cases, basically been an extension of an existing business model. With Airbnb and Uber and other similar operations, these kinds of old-fashioned two-sided market operations have been taken to a whole new international dimension. Airbnb and Uber have vastly extended the markets for residential accommodation and transportation.

As mentioned in the introduction to the paper, businesses living on transaction costs have existed 'as long as business itself'. Lawyers and real estate brokers were mentioned. However, Internet with its vastly improved capabilities for communication between and among individuals and businesses establishes a basis for markets to expand and be created. Internet allows for considerable decreases of transaction costs,

but just for this reason, it also in a paradoxical manner creates the basis for new businesses based on handling transaction costs.

5. The cases of Airbnb and Uber

5.1. Airbnb

Airbnb, originally called Airbed & Breakfast, is an Internet company founded in August 2008, based in San Francisco, California. The idea of renting out free space in their apartment came up in 2007. Airbnb founders, Nathan Blecharczyk, Joe Gebbia and Brian Chesky, rented out three airbeds on their living room floor and provided breakfast for their guests. On March 1st 2015, Bloomberg announced that Airbnb was raising money from investors in a financing round that would value the room sharing service at \$20 billion (Bloomberg, 2015).

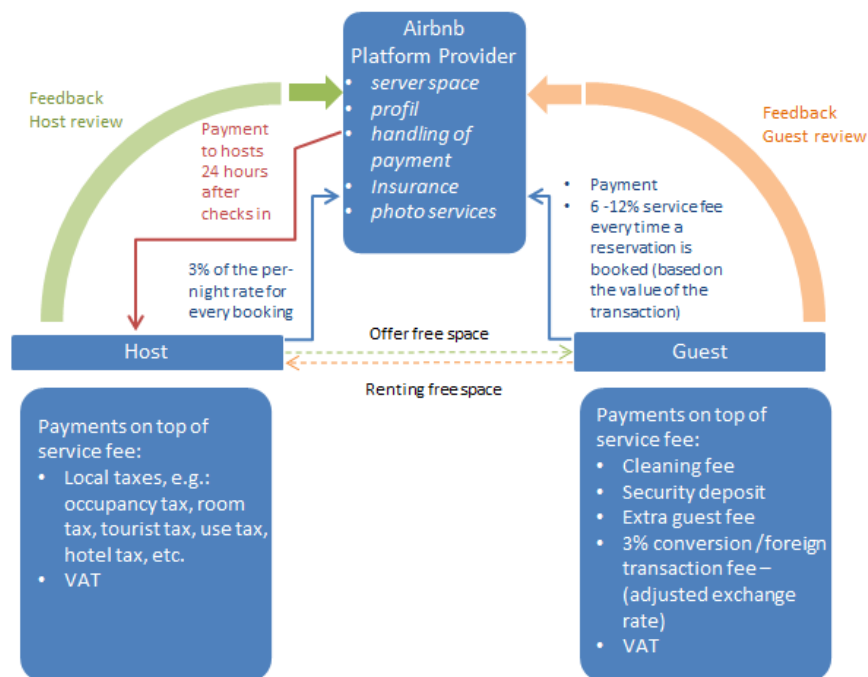
Since 2008, Airbnb provides an online platform that connects hosts who have places to rent with guests seeking to rent such places. The business has grown exceptionally, and in 2015 Airbnb is representing 1,000,000 listings in 34,000 cities and 192 countries (Airbnb, 2015). Airbnb has acquired several of its competitors and has surpassed the InterContinental Hotels Group and Hilton Worldwide as the world's largest room service provider.

Airbnb states clearly in their 'Terms of Service, Host Guarantee Terms and Conditions' that Airbnb does not own, sell, resell, furnish, provide, rent, re-rent, manage and/or control properties. Airbnb's responsibilities are limited to facilitating the availability of the site, application and services and serving as the limited payment collection agent of each host for the purpose of accepting payments from guests on behalf of the hosts. Guests pay Airbnb when they book a place and Airbnb releases the money to hosts 24 hours after the guests check in.

Airbnb charges hosts as well as guests for the use of their online platform. Both fees are calculated as a percentage of the applicable accommodation fee:

- Guests are charged a 6-12% service fee on top of the reservation every time a reservation is booked (Airbnb, 2015). The exact percentage of the guest service fee depends on the reservation subtotal. It falls steadily from 12% to 6% when the reservation amount is increased so that guests can save money by booking large reservations. The company claims that fees cover the cost of running the Airbnb platform.
- Hosts are charged 3% of the per-night rate for every booking. This fee covers the cost of processing guest payments and is deducted from the host payout. Hosts are responsible for setting their per-night rates, cleaning fees, and security deposits. Furthermore, hosts are responsible for following all laws and regulations, including paying any local taxes that apply to their accommodations.

Figure 1: Airbnb platform



The total fee may include taxes and cleaning fees. Airbnb charges VAT on its service fees for users (applicable to hosts and guests) from the European Union, Switzerland, Norway, Iceland, and South Africa. In some locations, Airbnb has made agreements with governments to collect and remit local taxes on behalf of hosts. Currently, Airbnb is collecting and remitting taxes in the following locations: Multnomah County and Portland, Oregon USA, San Francisco, CA USA, San Jose, CA USA, Chicago, IL USA, District of Columbia USA, Malibu, CA USA, Amsterdam NL.

If the guest pays for a booking in a currency different than the one the host has chosen in the listing, guest will be subject to varying Airbnb exchange rates which may not be identical to the real-time market rate. Furthermore, Airbnb charges 3% conversion/foreign transaction fees when booking is done in foreign currency. This accounts for Airbnb holding costs and currency risks. The conversion/foreign transaction fee is separate from and in addition to the Airbnb guest service fee. The conversion fee is applied to the reservation total after guest service fees have been added (Airbnb, 2015).

Depending on the host, the actual costs can vary due to cleaning fees, extra guest charges and security deposit. Moreover, it is very difficult for guests to estimate the total costs during a searching process because of the variation in local tax levels which makes the Airbnb pricing scheme less transparent than in the hotel industry.

Despite the fact that Airbnb has its own million dollars insurance policy, it is necessary to have a property-owner's insurance. Airbnb will cover the property and general furnishings but only after the property's own insurance policy is exhausted (Airbnb, 2015)

Even though Airbnb has left pricing decisions in the hands of hosts, they have recently started working on a predictive pricing algorithm which will provide hosts with a recommended price for their space depending on many factors including room style, property type, number of reviews, capacity, location, seasonality, pricing of other list-

ings, hotel and airline demand, and even temperature changes at the destination. However, it still allows the host to ultimately set the final price.

Airbnb is a prominent example of a company which is part of the sharing economy. In 2014, Airbnb was named 'company of the year' by Inc. magazine which claimed year 2014 to be the year of the sharing economy (Fox, 2014). During the last few years, the company has grown exponentially but also has faced many problems with regulators in regards to tax requirements and unfair competition.

5.1.1 Present and future implications for the hotel industry

Few years ago, nobody expected that the Airbnb platform would threaten the traditional hotel industry. Hotels have failed to predict the growing scale of Airbnb's activities. Airbnb's platform has scaled quickly in terms of users and numbers of transactions. A strong network effect has influenced the constant growth of hosts and guests. Through its platform, Airbnb has not just created new user behaviours but has changed the supply side of the hotel industry as well.

Since 2014, big hotel chains have started realizing that the Airbnb platform is affecting their business, but it is very difficult for them to quantify the impact. Hotel News Now Report has examined how new platform businesses are impacting hotel demand, with analyses of 10 Largest hotel companies by room count as illustrative case studies. In table 1, Airbnb is compared to four large hotel chains.

Table 1: Largest hotel companies by room count

Company	Existing Hotels	Existing rooms	Rooms in development pipeline
IHG InterContinental Hotels Group	4840	710,295	193,772
Hilton Worldwide	4278	708,268	230,000
Marriott	4044	692,801	240,000
Wyndham Hotel Group	7645	660,826	117,000
Airbnb		1,000,000	

Source: (The 2015 Big Brands Report)

Until recently, the luxury hotels haven't considered Airbnb as a direct competitor. This has changed due to a fact that Airbnb is expanding its offers into the business and luxury travellers' segments which are critical groups of customers to the hotel industry. In 2014, Airbnb entered the business segment, teaming up with Concur – an American travel management company, providing travel and expense management services to businesses. The agreement with Concur allows Airbnb charges to appear directly on travellers' expense forms. By 2015, Airbnb reports that just below 10% of its guests are business travellers (Weed, 2015).

Even though Airbnb provides an alternative to traditional hotels, there is a new trend among small and luxury hotel owners which are joining the Airbnb platform to list their rooms alongside with booking.com, trivago and other websites.

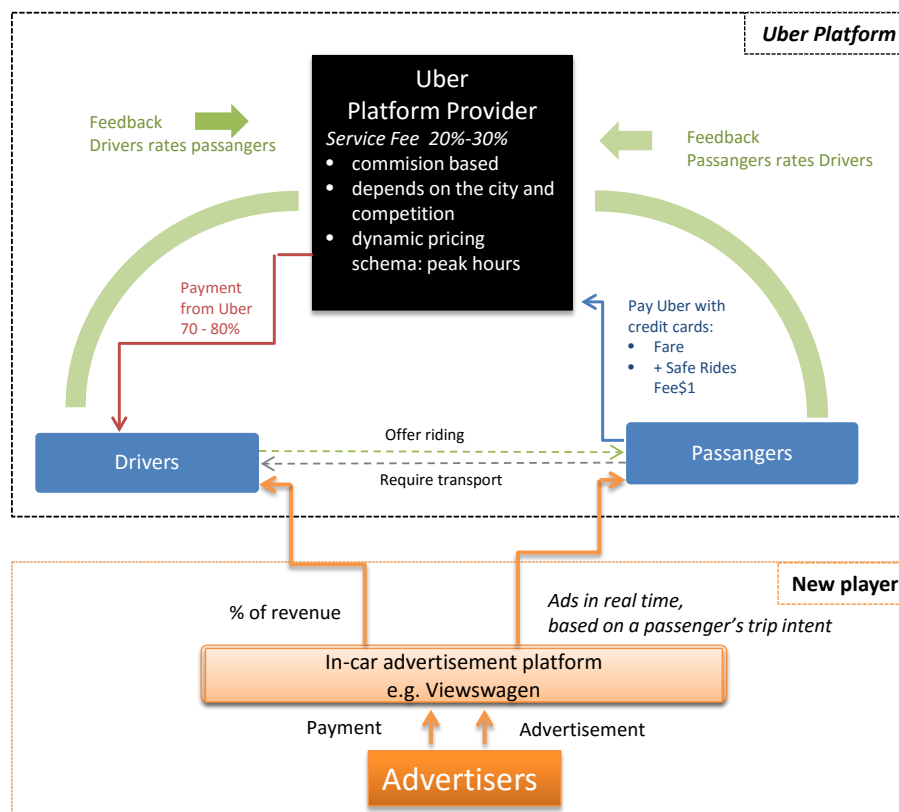
5.2. Uber

Uber is an US-based online transportation network company founded in 2009. On December 4 2014, Bloomberg announced that Uber was worth more than \$40 billion (Bloomberg, 2014). Uber does not own cars and does not employ drivers. Uber claims to be a marketplace where Uber's drivers as independent agents meet Uber's customers. Uber states in 'Terms and Conditions' that their services constitute a technology platform that enables users of Uber's mobile applications or websites to arrange and schedule transportation and/or logistics services with third party providers of such services, including independent third party transportation providers and third party logistics providers under agreement with Uber or certain of Uber's affiliates (Uber, 2015).

Uber represents a platform business and provides more opportunities for growth of a sharing economy. The core value that Uber delivers is a reduction of search and transaction costs for both drivers and passengers. The Uber platform can be classified as an exchange platform due to the fact that Uber creates value primarily by enabling direct exchange between actors. The Uber platform manages a network of drivers and passengers through apps and provides real-time ride sharing options. Uber provides also various options associated with transportation or logistics, including the transportation brands: Uber, uberX, uberXL, UberBLACK, UberSUV and UberLUX and the logistics brands: UberRUSH, UberFRESH and UberEATS.

Worldwide, the company now facilitates 1 million rides per day and is adding 50,000 new drivers per month. As of March 26 2015, the service was available in 55 countries and more than 200 cities worldwide (Uber, 2015). Uber, in contrast to Airbnb, is setting prices for rides. Payment is done directly to Uber not to the drivers. Uber's commission-based pricing structure means that the company will take a percentage of a driver's fee every time the driver gives a ride. Uber fares include a base fee as well as rates based on time and mileage, which vary from city to city. UberX, for instance, charges \$1.63 per mile and \$0.30 per minute in Seattle, along with a \$2.14 base fare and a \$6 minimum fee. On average, 70-80% of gross fares go to the independent drivers. Uber has stated that charges will be inclusive of applicable taxes where required by law. Some portion of the percentage that is retained by Uber goes to cover payment processing, payment fraud, refunds, customer service, dispute resolution, cellular handsets and local regulatory efforts.

Figure 2: Uber platform



In 2012, Uber introduced a dynamic pricing scheme due to the fact that there was a supply and demand imbalance during Friday and Saturday evenings. Uber offered the drivers higher prices during weekends. By offering more money to drivers, they were able to increase the road supply of drivers by 70-80% in Boston.

Dynamic pricing changes are calculated algorithmically when wait-times are increasing dramatically, and 'unfulfilled requests' start to rise. Prices are changed if utilization rates fall below 60% or are above 80% (Uber, 2013). In essence, there are two functions of the increased price model. One is to increase supply. The second function of the price increase is to temporarily intentionally reduce demand. Through these two mechanisms, the company is able to increase supply, assure reliability which is a key tenet of the company, and maximize the number of completed rides (Gurley, 2014). Uber has informed platform users that charges applicable in certain geographical areas may increase substantially during times of high demand.

In 2014, Uber introduced a \$1 Safe Rides Fee, paid for by riders. The new fee, which applies nationwide in the US, will cover the company's costs related to 'background checks, ongoing safety monitoring, education, insurance and safety features (e.g. an in-app emergency button)'. This new fee is for UberX — which lets everyday drivers shuttle people around town — and not for the more expensive UberBLACK service, which uses professional chauffeurs (Soper, 2014).

On top of the Uber platform, other companies are trying to build their business model. Viewswagen has recently launched an advertising platform inside Uber and Lyft vehicles that allows drivers to show promotions on tablet screens in cars' backseats. It uses GPS to generate specific ads targeted toward passengers as they ride.

5.2.1. Present and future implications for taxi industry

Uber, as the world's largest ride-hailing service operator, is directly affecting taxi companies' businesses. The taxi business is indeed sensitive to the fact that Uber and taxi drivers operate in the same markets subject to different rules: safety, privacy, fares, etc. Until now, taxi companies' response has been to demand more regulations for ridesharing. But taking into consideration that 70% of the world's population is expected to live in urban areas by 2050 and faces congestion problem, the view point has been put forward that a better alternative for taxis and customers would be deregulation for both - taxis and ridesharing (Beyer, 2015).

Felix Salomon has pointed out that Uber can actually raise taxi drivers' income over time, not lower them, due to the possibilities to sell their services to either taxi-fleet owners or to companies like Uber. Looking from this perspective, more competition on the market means higher income for drivers (Salomon, 2013).

Presently, however, the Uber platform is disrupting the status quo of the taxi industry around the world. The San Francisco Municipal Transit Agency has noticed a sharp and steady downturn in taxi use in San Francisco from 1,424 average trips per month in March 2012 to 504 in July 2014, a steep 65% decline (Agency, 2014). Uber already has and will increasingly have implications on the structure of the taxi industry, on jobs and on wages.

6. Implications for theory and analysis

In a paper from 2014, Belk (Belk, 2014) seeks to align the concepts of sharing economy and collaborative consumption by characterizing the Felson and Spaeth definition and the definition by Botsman and Rogers (Botsman & Rogers, 2010), which sees collaborative consumption as including 'traditional sharing, bartering, lending, trading, renting, gifting and swapping', as 'miss-specifications' (Belk, 2014). Belk (Belk, 2014) in contrast seeks to promote a definition of collaborative consumption as 'people coordinating the acquisition and distribution of a resource for a fee or other compensation'.

Such a definition puts collaborative consumption on par with the commercial versions of sharing. One of the most prominent discussions on sharing and collaborative consumption is on the commercial versions and aspects (for-profit) vs. the non-commercial (non-profit) versions and aspects. Criticism has been raised against the commercial versions for piggy-backing on all the non-commercial initiatives, where people share resources without charging any fees. Another line of inquiry is represented by, for instance, Rifkin (Rifkin, 2014) who in his book on 'The zero marginal cost society' among a multitude of other issues also writes about the sharing economy. The basic thought of the book is that in a growing part of the central sectors of society, there is a trend towards zero marginal costs. The clearest example is information and communication where the marginal costs of one additional person using a piece of information or communicating are (at least close to) zero (Rifkin, 2014). Other examples that he uses is sustainable energy and even transportation, and the idea is that if the marginal costs are zero then it will not be possible to charge for consumption and then eventually the economic foundations of capitalism will fall

apart – as is epitomized in the sub-heading of the book: ‘The Internet of things, the collaborative commons, and the eclipse of capitalism’ (Rifkin, 2014).

In this paper, we do not venture into such a discussion but stay with the shorter term (and maybe more realist) industrial organization implications of the sharing economy trends. These implications mainly relate to the issues of transaction costs, substitution (and complementation), and multi-sided markets. The lowering of transaction costs facilitated by Internet-based platforms allow for the exchange of goods and services between people that would not otherwise have been possible – simply because of the very high costs of searching, contacting and contracting that this would require. In a sense, new markets are created – we are dealing with market creation, as markets for private accommodation and private transportation are created. Also, new markets for intermediaries are created. The Ubers and Airbnbs are becoming gigantic business operations, where there formerly were no possibilities for such operations to be erected. At the same time, these new markets and market operators also substitute for existing business operations. As the new markets and operators do not service entirely new human needs (e.g. accommodation and transportation), there is a degree of substitution – but also complementation.

The examples of Uber and Airbnb discussed in this paper show that there can be a relatively large degree of substitution and a considerable derived competition between the old business models and the new ones. It is not likely, however, that the new business models in foreseeable time will entirely eradicate the old models (e.g. hoteling and taxi driving). But they can do serious harm to the existing business models. And, the question raised by Rifkin (Rifkin, 2014) is whether just a share of the market for the new operators will be able to tip the market in favor of the new operators. 10% is the figure cited by Rifkin. The reason should be that the margins in some industries are low and that losing just a share of the turnover may cause the market to tip.

This, however, is a slightly strange argument, as it presupposes that the exiting industries are not able to adapt and shrink if needed. The most likely scenario is that there will be a degree of substitution, but also a degree of complementation – on the demand side as well as the supply side. On the demand side, the new operators may attract users that did not previously use the services of the existing industries. On the supply side, as is shown with respect to hoteling as well as taxi driving, some of the existing operators may offer their services through the new platforms. Furthermore, it’s not only a struggle between incumbents and newcomers. The disruption of markets also leads to incumbents entering the markets of other incumbents. Once a relatively stable division of labor is shaken up in one industry, it will have repercussions in a number of surrounding industries.

In discussions on the sharing economy, many different trends and issues are now and then blended. This applies, for instance, to mixing the sharing economy issue with the presently very popular concept of co-creation (Prahalad & Ramaswamy, 2004). Obviously, there is co-creation in the sharing of facilities. However, the focus of the co-creation issue is different from the issue of sharing. Co-creation is about the joint creation of value and also of innovation (Sundbo et al., 2015) in the interaction between providers and users, while the commercial aspects of the sharing economy are basically about the creation of new markets. Also, it’s about the creation of new companies providing the platforms for the exchange of goods and services – the companies living on transaction costs.

In order to analyze these new sharing developments, we suggest using an analytical framework comprising theories on multi-sided platforms, transaction costs, and substitution and complementation. The new commercial sharing platforms are either two-sided markets or may develop into multi-sided markets. The primary function of such platforms is to deal with the transaction cost issue that has previously hindered such markets from developing to any great extent. The new markets will, to different degrees, substitute for existing providers and business models but will also enter into an interaction with existing business models in a complementary manner.

7. Conclusion

Current discussions in public media on issues relating to the sharing economy are mostly very enthusiastic about the new ways of sharing and transacting goods and services or rather critical concerning commercial sharing arrangements and businesses piggy-backing on the non-commercial activities and concerning labor conditions for those delivering the services and service quality for those receiving the services being downgraded – or rather the conditions for those working in the traditional industries being undermined by the newcomers. These are very important issues and will also, in different manners, affect the industrial developments and structures, for instance regulatory measures promoted by the taxi industry in order to defend the working and service conditions in traditional taxi businesses – and obviously also protect the existing markets from new entrants.

In the present paper, we focus on the implications for the industrial structures in the affected industries. The research question being asked has been concerned with the extent to which transaction cost theory can be used to explain the changing industrial structures in the application areas that the Internet-based platforms are addressing and how other theoretical frameworks can be helpful in understanding these developments.

The conclusion is that transaction cost theory is a central theoretical tool to understand the sharing economy. Internet-based platforms facilitate drastic reductions in the transaction costs between users and providers of, for instance, private accommodation and transportation. This creates whole new markets, which were previously only possible to a very limited extent. However, these new markets also substitute for existing accommodation and transportation markets. Theories regarding substitution and complementation must thus be added to transaction cost theory in order to analyze industrial developments. As has been shown with the Airbnb and Uber cases, there is not only substitution but also complementation.

An obvious question could be whether the new business models will entirely substitute for the old ones. The degree of substitution is obviously subject to concrete analyses in the different industries, but it seems that there could be considerable possibilities for substitution based partly on lower prices of the new sharing arrangements. However, there are also limitations, which are related to the fact that there are differences in value propositions, for instance, between a hotel room and private accommodation. Limitations are also related to the regulatory measures that will be taken in relation to the new business models, but also the adaptability of the existing industries and their competitive capabilities.

An interesting side effect is that the reduction in transaction costs is facilitated by business operations that in a number of cases become extremely highly valued huge international business companies. The reduction in transaction costs, which leads to increased possibilities for smaller business operations to function, at the same time leads to the creation of large business companies thriving on transaction costs. This is, in a sense, a paradox, which also bears witness to the strength of the capitalist economy. Rifkin (Rifkin, 2014) advances the idea that zero marginal costs will undermine the capitalist economy. However, the information and communication industries, which are core examples of the 'zero marginal cost economy', have shown the great adaptability of the capitalist economy. The industries thriving on transaction costs underline this.

The platforms that facilitate the lowering of transaction costs create two-sided markets or develop into multi-sided platforms. These kinds of business models become increasingly widespread facilitated by the Internet. On the basis of the abovementioned different theoretical approaches, the present paper proposes a theoretical framework for analyzing the sharing economy based on theories on multi-sided platforms, transaction costs, and substitution and complementation.

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Analysis on Collaborative Development of Meaningful Technologies in Services

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ICT is an important element in successful services. It is becoming more integrated in service processes and the collaborative technology development with stakeholders in service fields is a promising approach to realize meaningful technologies for services. However, such collaborative development of early-phase technologies has not been studied sufficiently. In this study, we conducted case studies of collaborative technology development with service firms. We clarified features in the development process and roles and capabilities of stakeholders.

1. Introduction

The role of ICT is becoming more important in services. The evolution of technologies including performance enhancement, downsizing and new algorithms enables service providers to apply ICT to various issues such as customer analysis and cognitive support for employees. For the development of meaningful technologies in services, collaborative development with stakeholders in workplaces is a promising approach (Greenbaum; Kyng, 1991, Bødker et al., 2009, Sanders; Stappers, 2008). A number of ICT development projects have been conducted and studied in collaboration with stakeholders in various workplaces (Fitzpatrick; Ellingsen, 2013, Kleinberger et al., 2007; Mumford, 2000). However, there are few studies that focus on the development processes of early-phase technologies in collaboration with service firms. To clarify effectiveness and success factors of such a development approach, a study on actual technology development projects is required.

In this paper, we analyse collaborative technology development projects with service firms. The research questions are 1) how the technology development process in collaboration with service firms should be and 2) what kinds of roles and capabilities are required in this technology development. The following contents of this article start from the literature study on ICT for service fields and its development approach in section 2. In section 3, we introduce two cases of technology development for services. In section 4, results and key findings of case studies are presented. In section 5, we explain several implications from these results and conclude this paper in section 6.

2. Background

2.1. ICT's role in service fields

Technologies, especially ICT have been affecting the way of providing services strongly. The typical purpose of applying technologies is substitution of human tasks and automation. In 1960-70's, automation technologies nurtured in the manufacturing industry were adapted to service workplaces. The Levitt's well-known article "the industrialization of service" (Levitt, 1976) presented various technologies to replace human tasks such as consumer credit card system, automatic car wash and automatic coin receptacles, and standardized supermarket and fast-food service systems.

In collaborative workplaces for services, communication technologies to support interaction and collaboration help workers. The research field on Computer-Supported Cooperative Work (CSCW) became prominent in the 1980's (Bannon; Schmidt, 1989). CSCW is an interdisciplinary research topic of organizational science and information science. To understand the nature of cooperation in workplaces and the role of technologies there, various workplaces such as hospitals (Reddy et al., 2001, Schmidt et al., 2007, Zhou, 2011), airport control (Fields et al., 2005, Halverson; Ackerman, 2008) and call centre (Ackerman; Halverson, 1999) have been studied. Based on the knowledge from these studies, several applications of communication support systems, groupware and social software have been developed (Ackerman; McDonald, 1986, Boland et al., 1992, Koch, 2008).

Then, ubiquitous technologies were proposed to assist employees and customers with small ICT devices. Mobile devices enable employees and customers to access information whenever they need. Sensors such as Radio-Frequency IDentification (RFID) and video monitoring and wireless networks to connect these devices also realize gathering data for services in real-time. As an example of applied research projects of ubiquitous technologies, Ambient Assisted Living (AAL) is a well-known research project to realize independent lives of elderly people with ICT devices (Kleinberger et al., 2007). Recently, ubiquitous technologies have been further sophisticated and integrated in daily life and work environments as Internet of Things (IoT) technologies (Aztori et al., 2010). IoT devices and "big data" collected from them are expected to innovate services with data analysis techniques (Zaslavsky et al., 2013).

Furthermore, robotics technology is gaining attentions as a new type of automation in industries including services. There have already been a number of cases to apply robotics technologies to service fields such as health care facility (Pineau et al., 2003, Wada et al., 2005) and they would be implemented more in services.

In summary, new types of ICT have been adopted in service industries continuously and they have been changing services.

2.2. Development approach of ICT for services

To realize effective use of ICT in services, how to develop ICT is an important issue. A systematic approach to formalize requirements for technologies in the systems engineering and requirement engineering domain (Kotonya; Sommerville, 1996) has

been commonly applied in industries. Meanwhile, the adaptation of technologies changes the way of work and service activities. Therefore, service processes must be considered and even redesigned in parallel to technology development. Business Process Reengineering (BPR) or Business Process Management (BPM) provides a methodology to formalize and improve business processes in companies (Childe et al., 1994). In this view, technologies are developed to substitute parts of the processes in a service system (Qiu, 2009). This approach is effective to the systematization of service processes and its concept suits the industrialization of services. In the early studies of New Service Development (Johnson et al., 2000), such systematic approaches were preferred.

A participatory approach is another important approach in developing technologies for services. Concerning complex services, especially with various interactions among stakeholders, it is difficult to apply the aforementioned systematic approach. In the research of CSCW, participatory design (Greenbaum; Kyng, 1991) to involve users in the development process of technologies is a dominant approach (Pilemalm; Timpka, 2007). In innovation studies, user-driven innovation (von Hippel, 2001) is an important topic in developing services (Sundbo; Toivonen, 2011). The basic idea of these studies is succeeded to studies on recent employee-driven innovation (Høyrup, 2010) and service design (Steen et al., 2011; Watanabe et al, 2015).

There have been a number of studies on technology-oriented service development (Tuunanen et al., 2011, Dominguez-Péry et al., 2013, Wallin et al., 2015). These development cases highlighted the participation of stakeholders such as technology developers, service providers and customers based on the several concepts of co-creation (Prahalad; Ramaswamy, 2004, Vargo; Lusch, 2004). Meanwhile, there have not been few analyses on technology development for services especially in the research phase or early development phase. In addition, how developed technologies can be disseminated beyond a single case study is necessary for delivering innovations in services broadly.

3. Case studies

3.1. Methods

In this study, we analysed two research projects which include early-phase technology development for services. Both of the projects were conducted by researchers of National Institute of Advanced Industrial Science and Technologies (AIST) in Japan as parts of the research project on service engineering from 2009 to 2012. We selected these cases with two reasons; 1) these cases included technology development from its early phase and 2) the developed technologies were disseminated to other service fields after the project ended.

As a research methodology, we conducted semi-structured interviews with the researchers who participated in the research projects. Two researchers from each case were interviewed. We mainly asked about the research processes (activities, events and important decision-making) and the stakeholders (concerns, roles, characteristics and their change) in the project period and later. As supplement of these inter-

view results, we also analysed internal research records and public project reports (CfSR/AIST, 2012).

3.2. Case 1: development of analysis and visualization technologies of employees' movement

The first case is an R&D project of human sensing technologies for the analysis of employees' movement. This project was conducted in collaboration with a restaurant company, elderly-care facilities and several other service companies. The research team developed a set of technologies to measure, estimate and visualize employees' movement and activities to improve work efficiency and customer satisfaction continuously.

3.3. Case 2: development of consumer behaviour analysis methods for the management of service operations

The second case is an R&D project of consumer behaviour analysis methods mainly for the management of service operations. Some retail companies and a restaurant company were the main partners of this project. In this project, category mining and demand forecasting methods were developed to support the decision making of store managers.

4. Results

4.1. Overview of Case 1

We first summarized the results of case studies. Table 1 shows the overview of case 1.

In FY2009, the research group started applying their basic technologies to measure and visualize human movement to several service fields such as restaurant and elderly-care facilities. Through this application, a manager of the restaurant service focused on this technology as a tool for continuous improvement.

In FY2010, the measurement technology was utilized as a support tool for continuous improvement. The research team applied the technology to three fields: traditional Japanese hotels, a restaurant and an elderly-care facility. The technology was accepted mainly in a restaurant service which originally had a bottom-up improvement activity known as the Quality Control (QC) circle (Watanabe, 1991). While applying the basic technology, the research team continued developing new technologies such as service operation estimation and reduction of the measurement device size.

In FY2011, the research team applied a developed new service operation estimation technology to the restaurant and the elderly-care facility in addition to the basic movement measurement. Through the experience in the past two years, the research team learnt how to represent and explain the results of measurement. The research team had been improving the visualization tool to represent the data to employees.

The research team also started systematizing a part of the technology application process such as automatically collecting data from devices.

In FY2012, the research team combined financial data with measurement data and evaluated the technology from the management perspective. In this phase, the technologies and their application process were almost established. The research team started the discussion to develop a new business to adapt technologies to service fields as business.

The start-up company was launched in 2014. Various kinds of workplaces such as not only other kinds of service fields but also manufacturing workplaces became targets of technology application. Another interesting change was that the visualization tool became major strength of the research team. Instead of using the research team's own measurement technology, it became possible for them to combine different kinds of measurement technologies with their visualization tool to evaluate workplaces.

Table 1 Overview of case 1

(Fiscal) year	Main topics
2009	- The research team explored applicable fields of their basic measurement technology.
2010	- The measurement technology was used in some service fields as a tool of continuous improvement. - The research team developed new technologies (service operation estimation, etc.) in parallel.
2011	- The research team applied the developed service operation estimation to the service fields. - The research team improved skills and a tool to explain the capability of the technologies.
2012	- The research team evaluated the financial benefit of the measurement technologies. - The research team started discussion to develop a new business for the measurement service.
Later	- A new company to provide the measurement service was launched. - The visualization tool became a major technology for the research team.

4.2. Overview of Case 2

In Table 2, we presented the overview of the case 2.

In FY2009, the research team started the study on service fields by utilizing quantitative, numerical data to analyse services. They focused on Point-Of-Sales (POS) data that represent the usage situation of services. Though the POS data analysis had been already a well-known approach, they considered that the diversity of prefer-

ences of consumers was not taken into consideration sufficiently. They started analysing a retail service and a restaurant service and developed a new classification method of customers by numerical analysis.

In FY2010, the research team focused on a new issue to be tackled from the interviews with store managers. In the store operation of store managers, how to determine work shift and procurement was the major issue. To support this, the research team studied demand forecasting that is important for both operations. The research team interviewed store managers on possible causal information which affects demands of customers and established a demand forecasting method. They applied the developed technology to both retail and restaurant services and gained significant results.

In FY2011, the research team added work shift design support and communication support with customers, and developed a management support technology package. The licensing of this package also started and has been applied to different kinds of services. The research team has been continuing a study on management support, especially focusing on benchmarking with other service providers.

Table 2 Overview of case 2

(Fiscal) year	Main topics
2009	<ul style="list-style-type: none"> - The research team started studying Point-Of-Sales (POS) data for the quantitative analysis in retail and restaurant services. - The research team developed a new classification method of customers by numerical analysis.
2010	<ul style="list-style-type: none"> - The research team focused on demand forecasting after the interviews with store managers about the problems in work shift and procurement. - The research team developed a demand forecasting method based on interview results of store managers.
2011	<ul style="list-style-type: none"> - Combining other technologies (work shift design support and communication support with customer), the research team developed a management support technology package and started its licensing.
2012	<ul style="list-style-type: none"> - The research team started the study on a benchmarking method for management evaluation.

4.3. Findings

4.3.1. Technology development process

From case studies, we figured out three phases of the technology development process.

1) Exploration phase

In both cases, the research teams started their research with rather the technology-push approach. They also applied some other approaches in addition to the success-

ful one shown above. After the trials of these approaches, the applied technologies and application fields were eliminated. We call this phase “exploration phase.”

2) Maturation phase

After the exploration phase, the research teams focused on specific problems and approaches to tackle them in service fields. Through the interactions with stakeholders in service fields, the problem and its solution were gradually clarified. As a parallel activity, technology development was conducted in both cases. Through the process of development, application and evaluation of technologies several times, the technologies and the application processes became established. We call this phase “maturation phase.”

3) Dissemination phase

The research team standardized their own solution including technologies and application processes to disseminate to various service fields. This solution was implemented, in one case as a start-up company and in the other case as a technology package. These solutions were adapted to various fields, some of which were not related to the original application fields. For example, the measurement technology in case 1 was applied also to manufacturing workplaces which had difficulty in analysing their work processes. We call this phase “dissemination phase.”

4.3.2. Roles and capabilities in research teams

We figured out three kinds of roles in the research teams.

- Research manager

Research manager is a role to manage the research process and resources of the project. They determined which technologies and service fields should be studied. The relationship building with the management of research fields was also an important role of the research managers.

- Field researcher

Field researcher is a role to have a direct contact to service fields. Field researcher clarified requirements and situations in service fields and applied technologies. The relationship building with service employees was also an important issue. In case 1, one researcher mainly communicated with members in QC circles to explain the meaning of measurement data. Field researcher was required to understand the concerns and objectives of stakeholders in the service fields and aligned them with the research objectives. Communication skills to explain the meaning of projects and technologies were also important.

- Technology development researcher

Technology development researcher is a role to develop concrete technologies. Since the technology development took a long period, its process was conducted in parallel. In case 1, a new technology of service operation estimation developed in 2010 was actually applied to the service field in the next year.

Some researchers in the research teams took multiple roles. While most researchers in the research team took a single role in case 1, the interviewed researchers in case

2 took multiple roles; one as a manager and a field researcher and the other as a field researcher and a technology development researcher.

4.3.3. Roles and capabilities in service fields

In the cases, the following roles were observed in the service fields.

- Executive

Executive was not necessarily related to the research activities directly. However, whether they had concrete objectives toward the research projects affected their results. Some interviewees mentioned that projects with companies whose executives did not have clear goals to the research projects were difficult to continue.

- In-charge manager

In-charge manager who directly took care of a research project was a key role. As was required for executives, in-charge managers also needed a concrete objective toward the research project. Their objective directly related to problems in service fields. In case 1, the in-charge managers were interested in the productivity of service operations from the experience of activities in QC circles. In case 2, the in-charge managers as store managers had concerns in improving their store operations.

- Employees

Employees were directly affected by the research project. They were also required to be at least positive to participate in the project. In case 1, employees who had experiences of QC circles were able to accept the research project and technologies. According to one interviewee, one employee said that she or he felt lonesome to work without a measurement device on the last day of measurement. This implied the acceptance of the technology by employees in case 1.

4.3.4. Interactions and mutual learning in projects

The members with the aforementioned roles in the research teams and service fields interacted and affected one another. Figure 1 shows their relations.

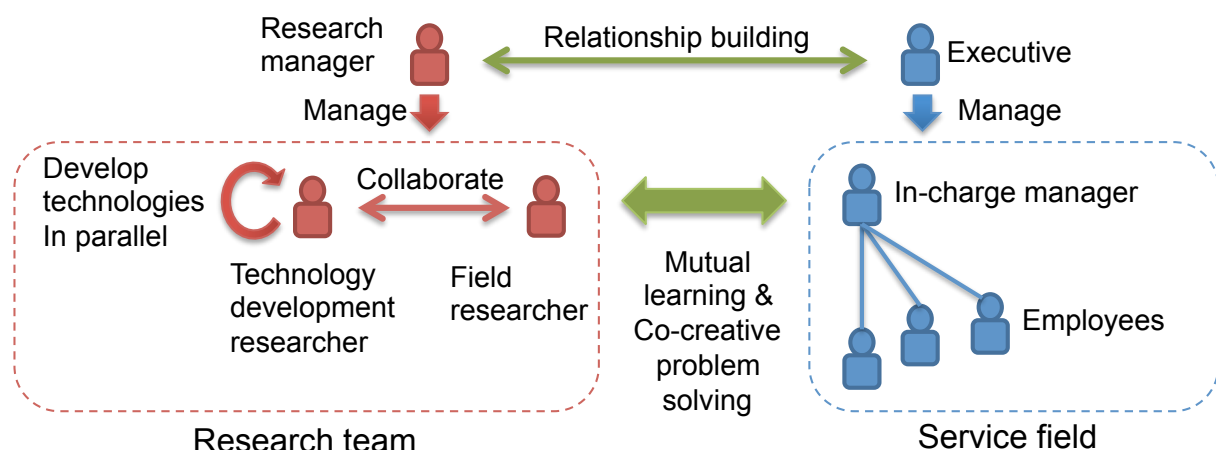


Figure 1 Interactions between the research team and the service field

The aforementioned capabilities of both the research teams and the service fields did not necessarily exist when they started a collaborative study. In the cases, they learnt their concerns and required capabilities mutually through continuous interactions. In case 1, employees in the service field got accustomed to putting devices to them through several experiences. In-charge managers needed some time to understand the actual potential of technologies.

Meanwhile, the field researcher also learnt how to explain the purpose of the research and the meaning of technologies through several trials. Through the projects, the research teams and the service fields developed mutual understanding. In addition, new technologies and solutions were created through the interaction with the service field. In case 1, the visualization tool for communication with the members in the service fields was developed and became one of the core technologies to conduct their research. In this view, the interactions between the research teams and the service fields were the co-creative problem solving process.

5. Discussion

5.1. Technology development process

We figured out three phases in the technology development process for services. In the exploration phase, the research teams conducted several trials to apply different kinds of technologies in several service fields. We consider that this process could be more sophisticated by conducting the prior field study to understand requirements and situations of target service fields. In the cases, the research teams also put more efforts on observation and field study for further understanding of service fields in the later phase of the research projects. Meanwhile, a certain amount of trial-and-error processes are unavoidable since the technologies which research teams aim at developing do not necessarily fit to situations and requirements of service fields. To reduce risks of mismatch between brand-new technologies and their usages, it is important to have several fields to conduct research in parallel.

In the maturation phase, the research team needs to manage the technology development and its adaptation to service fields. Since the technology development requires a long-term period, its process tends to be several years and should be in parallel with the requirement analysis and problem solving in the service fields. The coordination between field researchers and technology development researchers is important to realize meaningful technologies to service fields shown in Figure 1. Another important point is to gain positive attitudes and participation of stakeholders in service fields. In both cases, the interviewees put efforts to develop good relationship with service fields.

After the maturation of technology and its application process in one or some service fields, the dissemination phase started. The success in at least one service field is important in disseminating its result to a numbers of service fields.

5.2. Roles and capabilities in research teams

According to the aforementioned requirement in the exploration phase, research managers are expected to manage relations with several service fields. In the cases, two research teams shared one service field. The collaboration among researchers is effective to respond to the requirements of service fields flexibly. In addition, it is preferable that research managers can develop the long-term relationship with service fields.

In the other two roles of researchers, field researchers especially take an important role in collaborative technology development. Field researchers need a skill to communicate, understand and assess service fields. The techniques and experiences in social studies are expected to field researchers. In both cases, the field researchers had such basic skills. In addition, field researchers also need to understand the technologies for collaboration with technology development researchers. To develop the researchers who have both skills, specialized education for that is necessary.

5.3. Roles and capabilities in service fields

From the findings in the case studies, the concrete objectives of members in service fields toward technology development are necessary. The importance of in-charge managers' willingness and technology acceptance of employees was pointed out in the existing study, also (Wallin et al., 2015). In addition, in-charge managers need to manage the balance between research and business practices. Human resource development of in-charge managers is important to promote collaborative technology development for services.

5.4. Interactions and mutual learning in projects

There are several implications for the success of learning process in collaboration. First, workplaces with QC activities successfully utilized technologies in their work. This could be because employees had already had sufficient concerns in their performance. To let employees feel the effectiveness of technologies, it is also important to provide proper feedbacks or to assess the effectiveness with evaluation standards for service fields. In case 1, visualization technology took an important role to provide feedbacks to employees. In case 2, the research team developed evaluation standards and an interface to show them in the technology package.

Meanwhile, it could harm overall performance of service systems to evaluate them only with a single viewpoint or evaluation standard. The reflection of technologies and evaluation standards is essential. In Case 2, the research team reflected the results of their research every year and changed their approach.

5.5. Other issues

In addition to the development of technologies for certain problems, the classification of problems and correspondent technologies is important to provide adequate solutions for new cases. For this purpose, the meta-analysis of technology development cases is necessary. For example, Watanabe et al. (2013) classified service process-

es into categories and correlated them with technological solutions. The further study on such a meta-analysis is required.

6. Conclusion

In this study, we first figured out ICT's roles in services in the past from the substitution of human tasks to the support of collaboration. Technologies are becoming more ubiquitous and important in service systems. As a result, the development of new technologies for services should be more integrated to service development. Through two case studies to develop new technologies for services, we clarified the development process with three phases; exploration phase, maturation phase and dissemination phase. We also figured out three kinds of roles and their required capabilities for both research teams (research manager, field researcher and technology development researcher) and service fields (executive, in-charge manager and employee). Especially, field researchers in research teams and in-charge managers in service fields are required to collaborate with each other for managing research and practical issues and also technological and socio-technical issues. The collaborative relationship between research teams and service fields created a dynamic process of mutual learning and co-creative problem solving.

The result of this study is based on two cases studies. To obtain more general remarks, more cases should be considered. In addition, the interviews of stakeholders in service fields should be also conducted. These are the remaining issues in the future study. In addition, the meta-analysis of various cases to classify problems and solutions in services is necessary.

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I6: ICT and innovation

Chair: Metka Stare

Governance and innovation in public sector services: The case of digital library

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Abstract

Based on a longitudinal case study of ICT adoption and e-services development in a Danish library, we examine how governance modes affect technical and organizational change in the public sector. We contribute to extant literature on the links between governance and innovation by highlighting three important aspects that characterize such links. First, our case study shows that the transition from what could be considered as a spurious New Public Management approach towards a “networked model” implies important organizational innovations and more emphasis on bottom-up decision making. Second, we provide evidence of increasing involvement of end users in innovation and co-creation activities. Third, the increasing involvement of users has created important innovation opportunities that are more and more characterized by their frugal/bricolage nature, hence more localized but not necessarily trivial and relatively easy to diffuse to different contexts.

Key Words: Governance, Innovation, Public Sector, Services, ICT, Virtual Library

1. Introduction

The public sector has long been considered as characterized by low levels of innovation, largely lagging behind the business sector. This perception is partly motivated by the existence of some structural features of public sector that may hinder innovation, but does not correspond to the state of affairs in general, and is largely misleading in some areas.

Indeed, one might argue that innovation has always been present in the public sector, what changes in different circumstances and over time are the nature and intensity of innovation itself, as well as the role of actors involved. Circumstances that may affect innovation in the public sector include: technological factors, and particularly the massive introduction of ICTs in public services; economic factors, as public administrations (PAs) are increasingly forced to do better with less resources; and socio-demographic factors, ranging from ageing population, increasing needs to invest in knowledge intensive activities and in green technologies. This set of factors combines with changing ideological perspectives that have emerged and dominated in different phases of recent history. One way to characterise such perspectives is to distinguish: a) the “traditional” public administration model, dominating in the post-World War II (WWII) for more than three decades, that can be broadly sketched as state and producer centred and based on largely hierarchical relations within PAs; b) the “New Public Management” that has been pervading PAs since the mid-1980s and relies on the idea of emulating the private sector and of introducing market selection mechanism within PAs; c) the “Networked Governance” model, emerged in the early 2000’s, which is much more attentive to civil society and is largely shaped by its

pressures, for example by directly involving the users in the service development process (see Bennington and Hartley 2001 and Roste 2005 for more on this distinction). It has been argued that these paradigms can be associated with a very different nature of innovation, and with different roles of key players in innovative activities, including policy makers, public managers and users (Hartley 2005). The purpose of this paper is to evaluate whether and how the nature and organization of innovation and the roles of the actors involved have changed over time in relation to these paradigms in a specific public sector domain, i.e. university library services. The focus is here on the transition from a New Public Management approach (with elements from the Traditional Model still embodied in it) to the Networked Governance perspective.

Using a longitudinal case study of the introduction of new services with special focus on ICT related services at Roskilde University Library since the end of the 1990's through 2014, we will show how the nature and organization of innovation and the roles of the actors involved has changed in the transition from one paradigm to the other. We will highlight that while the distinction between paradigms is still rather blurred in the examined case, one can indeed detect some remarkable changes in the nature and intensity of ICT related innovations being developed and up taken over time. In general terms, we will observe more and more emphasis on organizational innovation, a decreasing role played by radical technological innovation and increasing incremental, "bricolage" type of improvements in services, and a greater involvement of users in the co-creation of new services. It is suggested that analysing this experience in a long run perspective may help understand future avenues for innovation in both public and business services.

The remainder of this paper is organised as follows. Sections 2 and 3 illustrate different models to characterise the links between public sector governance and innovation, building on Hartley's seminal contribution and taxonomy. In section 4 we provide some introductory evidence on Roskilde University Library and describe the case study methodology we shall follow to shed some light on the evolution of governance and innovation in this specific institution. Section 5 will illustrate the transition from what could be roughly identified as a NPM phase, embodying elements from the traditional hierarchical approach, to the emergence of a networked approach to public sector innovation, with specific reference to the case of Roskilde University Library. Section 6 will provide some concluding remarks.

2. Public sector governance and innovation

Hartley (2005) identifies three different phases in the evolution of public sector innovative activities in recent history, reflecting different governance models:

(a) a "traditional" model wherein innovation is initiated by political decisions at the highest level (policy makers as "commanders"), imposed to the public management, perceived as "clerks and martyrs", and delivered to passive users seen as "clients". This view is consistent with big technical changes and large purchases of technology, as visible efforts to innovate that can be used by policy makers as assets in political markets;

(b) a "new public management (NPM)" perspective that takes on board the issues of efficiency and the need to customize services to improve performance. Policy makers

indicate objectives of improved performance, public managers are perceived as efficiency maximizers, and the emphasis is on organizational change and on the need to increase involvement of different organizational layers within PAs. Users are considered as “customers” whose needs must be explored and dealt with, as their satisfaction becomes a key element of public sector performance to be monitored;

(c) a “networked governance” view of innovation characterized by an involvement of innovators at both the local and central level, with a particular emphasis on incremental changes at the front-line level. Policy makers play the role of interpreting emerging technological and social innovation opportunities, thus “inspiring” innovation, public managers are key to exploring technologies and new avenues. This model is more consistent with a bottom-up approach to innovation, and users are increasingly seen as co-creators of new services and processes.

These different conceptions and related patterns of innovation in PAs indeed correspond to specific historical phases: the traditional model has dominated in the early decades of the post WWII period; the NPM approach has become a key reference in the late 1980s, while the emergence of the networked model can be observed in the early 2000s. However, such models can also co-exist in various ways in any given moment in time. On the one hand, elements of previous approaches tend to persist and mitigate the emergence of new models, thus blurring distinctions in the real world. On the other hand, the three approaches can be perceived as competing paradigms that tend to prevail according to the nature and intensity of changes in the (economic and technological) contexts in which PAs are active.

Hartley’s framework (Table 1) has the merit of being rather comprehensive and systematic, and helps integrate different insights from the literature, and interpret ongoing developments in many public service fields. Some evidence on patterns of innovation in the public sector appears to be roughly consistent with this conceptualization. Examples cited by Hartley herself illustrate the emergence of these three models of public sector governance and innovation. Several studies have documented the wide diffusion of top-down approach to innovation in PAs, providing indirect evidence of the fact that elements of the both the Traditional and of NPM approaches tend to persist in spite of important changes in technological paradigms (the ICT revolution) and in the presence of new and increasing pressures from civil society (EC 2011, Epsis 2013). Nevertheless, there are some signals of the emergence of networked governance innovation offered by other studies, such as the Trends and Challenges Report (Rivera and Leon, 2012), and the Tech4i2 SMART report on eGovernment (Osimo et al 2013).

Table 1. Innovation and improvement in different conceptions of governance and public management. A synthesis of Hartley’s approach (Hartley 2005)

	<i>‘Traditional’ Public administration</i>	<i>‘New’ public Management</i>	<i>Networked governance</i>
<i>Innovation</i>	Some large-scale national and universal innovations.	Innovations in organizational form more than content	Innovation at both national and local levels
<i>Improvement</i>	Large step-change	Improvements in manage-	Aiming for both trans-

	improvements initially, but less capability for continuous improvements	rial processes and systems. Customer focus produces quality improvements in some services	formational and continuous improvement in front-line services
<i>Role of policy-makers</i>	Commanders	Announcers/commissioners	Leaders and interpreters
<i>Role of public managers</i>	"Clerks and martyrs"	Efficiency and market maximizers	'Explorers'
<i>Role of the population</i>	Clients	Customers	Co-producers

Even though Hartley's framework provides a helpful and stimulating distinction of the different phases in the evolution of public sector innovative activities, it might be useful to identify some issues that are not fully considered in this approach and would need to be dealt with. First, Hartley's model does not fully account for the *complexities within PAs*. In particular it articulates the vertical process from policy makers to managers down to users, without considering the further distinctions between different layers of managers and employees involved in the design, development and provision of new services. This equals to underestimating the role of barriers, conflicts and interactions across these different levels which severely affect performance and effectiveness of services. Second, Hartley's model leaves the *role of users* rather underdetermined, even if identified with standard labels such as "clients", "customers" and "co-creators". One needs better clarify what could be beyond these labels, and show how these roles change in the presence of new technology and of emerging pressures from civil society. Third, Hartley's framework appears to oversimplify the links between governance and the *nature of innovation*. The underlying assumption is that radical innovation is favored by the traditional governance approach, whereas organizational innovation is required by NPM and both radical and "bricolage" innovation are relevant in networked approach. It appears that such a distinction might be too sharp and that innovation patterns are becoming more and more complex in the transition from one model to the other.

3. Elements for improving the framework

To overcome these limitations it might be useful to recall some ideas from the literature which help improve Hartley's framework.

As for the first set of issues (*complexities within PAs*), one could refer to Jane Fountain (2001, 2007), who has focused particularly on eGov in the US and was perhaps the first who emphasized that it is not only nor primarily a matter of technology being implemented from the top down, but a matter of technology "enactment" involving all different levels of PAs. Indeed she largely disregards the user, but develops an extensive analysis of the different actors involved on the supply side. See Arduini, Denini, Lucchese and Zanfei (2013) for a review of Fountain's approach and derivations. This set of issues connects to the literature on the distinctions between front office

and back office innovation. More generally, these contributions of Fountain's are broadly consistent with the stream of literature on the coevolution of ICT, organizational change and human capital development. See Seri and Zanfei (2013) for a review on this topic. The latter strand of literature has so far been explored mainly in the area of private business, but has received some limited attention in the case of public sector too. There are links to the wide literature on Solow's paradox (that ICT can be seen everywhere but in productivity statistics). See inter alia Brynjolfsson and Hitt, (2000).

As for the second set of issues (going inside the black box of *user driven innovation*), Scupola and Nicolajsen (2010, 2013) help better articulate how the user can be involved at different stages of the innovation process. Among the issues to be introduced, one could emphasize: the different roles played by users at different stages of innovation processes (Alam and Perry 2002), the benefits of face-to-face meeting in user-producer interactions (Magnusson 2013), and the risks and challenges of user involvement in innovation processes (Nicolajsen and Scupola, 2011; Prandelli 2006). What makes this stream of literature important is that: it helps to identify different roles for the user, which go beyond the "co-creator role" mentioned by Hartley; it helps operationalize the different way of involving users in the different phases of the innovation process; and it points out that user involvement is not an easy task, especially in co-creation. From this perspective, one additional line of argument stems from Nathan Rosenberg's research on the role of users in shaping the pace and direction of technical change through their technological expectations (Rosenberg 1978); and on the importance of learning by using in the development of new knowledge especially in the presence of complex technologies (Rosenberg 1982). Even more interesting, Rosenberg (1982) shows that an important part of learning by using takes the form of "disembodied innovation", that is a stimulating category to be taken into account particularly when talking about innovation in services. This line of argument on the circumstances under which users can be fruitfully involved in innovation, has been strengthened by the increasing perception of the revolutionizing role of ICTs and digital economy. Once again, some insights can be drawn from the literature reviewed by Scupola and Nicolajsen (2010, 2013), mainly referring to how ICT changes the role of users in business services. This literature shows that huge advantages are associated with the involvement of users in innovation processes, through ICTs and especially the World Wide Web and social media. The ways to involve users span from web based surveys and 'complaint areas' in the idea generation phase, to 'virtual product tests' in the product test phase (Prandelli et al., 2006, 2008;), to online idea competitions to create user-adjusted design of products (e.g. Ogawa and Piller, 2006; Franke et al., 2008). Virtual communities and social media networks are other examples of customer involvement as a means to help organizations to innovate products or services. Lego Mindstorm and online gaming are well known examples in this respect (Jeppesen and Molin, 2003). Virtual communities may be initiated either by user or by producing firms. However, in both cases user involvement is based on their own interest and prestige in the community. In a different context, Osimo et al (2012) also emphasise the role of end users as promoters of web based innovation. In fact, with reference to eGovernment, they make a big argument of the importance of users initiating innovation in public service provision in the age of web 2.0.

As for the third issue (*nature of innovation* involved according to the innovation governance model), we could agree on the general statement that the 3 approaches singled out by Hartley do have different implications on the characteristics of

innovation being undertaken (scale of investment, different emphasis on organizational change, incremental vs. radical innovation). Nevertheless one needs to emphasise that these characteristics of innovation are not exogenous, but are largely affected by the role of actors involved. Once again, some reference can be drawn from Scupola and Nicolajsen (2010, 2013). By reviewing the literature on customer involvement and type of innovation, they conclude that innovations initiated by the users or developed with the involvement of the user are mostly incremental in nature. From this perspective, it should be emphasized that web 2.0 seems to favour incremental innovation and reputation, more than drastic technical change. In addition, there are insights on the importance of bricolage innovation in services (Fuglsang 2010) and in public service innovation in particular. 'Bricolage' innovation can be conceptualized as problem solving on the spot using existing resources. Changes occurring through bricolage in everyday situations can be building blocks to gradually and slowly create new solutions and structures. However, the question is how bricolage can be understood in an organizational context and how can bricolage activities integrate with more structured innovation planning within an organisational context (Fuglsang 2010).

An additional insight is that innovation requires a higher concentration of competences in the first approach of Hartley's framework (the traditional, hierarchical one) as it presupposes that lower level management and employees are mere executors; then it implies a higher diffusion of competencies in the second approach (new public management perspective) as it requires public managers at all level to be efficient in the use and implementation of new technology; and it benefits from an even higher dispersion of competencies in the third model (network type of governance) as it involves a strict interaction with users who become more capable to co-create innovation, the more they are themselves skilled.

The analytical framework we have developed here will be used to articulate the case study, to show how different governance models and patterns of innovation have emerged in the recent history of ICT adoption and diffusion within Roskilde University Library. We will rely on qualitative data collected over more than a decade. This time span allows following the transition from a rather spurious New Public Management setting, which embodies several elements of the traditional hierarchical approach to innovation, to the first manifestations of the networked model. Although it might be a rough distinction we shall refer to these as Phase 1 and Phase 2.

In the rest of the paper, we will first illustrate the research method followed, and then we shall examine the changing context in which ICT based innovation have taken place, the different nature and intensity of organizational and technological innovation that have been developed in the library system in the two phases under observation, and the role played by the different actors involved (policy makers, library management and servants, users).

4. Research Method

To investigate whether and how the nature and organization of innovation and the roles of the involved actors have changed over time in relation to the transition from a New Public Management paradigm to the first manifestations of the networked model in Hartley's framework we conducted a longitudinal case study (Yin, 1994) of Roskil-

de University Library (RUB). The Danish research library sector was chosen as the empirical context of this study since in Denmark libraries have undertaken a huge transformative process since the mid 1990's due to the policy program "IT Society for all" launched in the 90's. In this paragraph we first describe the Danish library sector in general, then present how RUB is organized, and finally present the research method and data collection process and techniques.

4.1 Research Context : The Danish Library Sector

There are two types of libraries in Denmark: public libraries and research libraries. The purpose of public libraries is to promote information, education and cultural activity by placing books and other media at the disposal of the public (*Thorhauge*). Research libraries mainly serve higher education and research institutions even though they are also open to the public at large. In Denmark there are 20 major research libraries connected to universities and other higher-level educational institutions and a large number of smaller research libraries connected to other educational institutions. Both public and research library services are free of charge, but libraries can demand payment for special services (Danish National Library Authority <http://www.bs.dk>).

The Danish library system is based on the Danish citizen's fundamental right to knowledge and information. The Danish National Library Authority (DNLA), an agency under the Ministry of Culture, is the Danish government's central administrative and advisory body to the public libraries and the research libraries. DNLA is also the administrative authority for the Danish law no. 340, [Act on library activities](#) (Lov om Biblioteksvirksomhed) of 17 May 2000, and the amendment, law no. 30 of 10 January 2005 (Danish National Library Authority, <http://www.bs.dk>). DNLA is responsible for advising the government on the organisation, co-ordination and strategy for the library service and gives professional advice to ministers and public authorities, as well as local authorities, libraries and information services. In addition, DNLA has an active role in national and international collaboration within the field of libraries, documentation and information. DNLA is also responsible for collecting and providing statistical information about Danish libraries as well as acts as the administrative base for Denmark's Electronic Research Library, a major institutional initiative for the Danish libraries virtualization process (<http://www.bs.dk/>). In fact DNLA's vision in the 21st century is "the development of the hybrid library, where an increasing number of electronic services work in unison with the physical library and its particular services, and where the interplay between virtual and real services is forever vibrant" (<http://www.bs.dk/>). In this paper we conceptualize the "virtual library" as a library that facilitates users to search, browse and retrieve selected information from sources worldwide instantly from the users' own network-connected computers, anytime, anywhere as well as to request help at any point in the process. Our definition is close to Maness (2006)'s "library 2.0" definition: according to which the virtual library could be:

- **User-centered.** Users participate in the creation of the content and services they view within the library's web-presence, OPAC, etc. The consumption and creation of content is dynamic.
- **Socially rich.** The library's web-presence includes users' presences. There are both synchronous (e.g. Instant Messaging) and asynchronous (e.g. social networks) ways for users to communicate with one another and with librarians.
- **Communally innovative.** It rests on the foundation of libraries as a communi-

ty service, but understands that as communities change, libraries must not only change with them, but must allow users to change the library. It seeks to continually change its services, to find new ways to allow communities, not just individuals to seek, find, and utilize information.

Such important transformation from physical to virtual and hybrid libraries and relative innovation challenges has been widely dealt with in the literature on innovation (e.g. Scupola and Nicolajsen, 2010; Carr, 2009; Scupola, 2009) as well as library and information science (e.g. Wu and Abdous, 2013).

4.2 The Case: Roskilde University Library

Roskilde University Library (RUB) is a research library serving the students and staff at Roskilde University. Roskilde University accounts for about 9000 students, 650 teaching staff and about 430 employees with technical and administrative tasks. It is located in Roskilde, a city about 35 km. from Copenhagen, the capital City of Denmark. RUB was founded in 1971, as part of Roskilde University. As a research library RUB is responsible for providing Roskilde University staff and students access to information and materials needed for research, teaching and learning. Regional research and educational institutions, businesses and citizens have access to the library as well (www.ruc.dk). In 2001 RUB moved into a new building, designed by the Danish prestigious Henning Larsen's Architects Company. Today the library counts 36 employees. The library consists of a 8,000 square meters building, of which 4.500 square meters are for public use, 930 for offices and 875 for closed stacks. In 2013 it had a collection of about 944,000 books and 218,000 AV media, and counted about 4 million downloads (See Appendix 1 for a detailed overview of the key figures of RUB over the last 10 years). Over the last decade, RUB has undergone a virtualization process initiated by the government in mid 1990s. This process has substantially changed the organization, the services and the service delivery of many of RUB's library services by substantially increasing self-services. Examples of new services and service delivery processes are access to e-journals and e-books, digital repository of all the student projects, and virtual reference such as "chat with a librarian" service. From an organizational point of view, the library has been reorganized several times over the last decade. In 2015 RUB organization consists of top management (a director and a head of reader services) and 4 lines (departments), each with a dedicated staff and a department head, also called line manager. Some employees might belong to different lines, thus creating a matrix organization. RUB can be defined as a "hybrid library" as it has maintained both its physical buildings and a number of face-to-face services while simultaneously offering a number of electronic services and self-services.

4.3 Case Study Design and Data Collection

A single case study approach was adopted to study the relationship between different governance modes and innovation within the research library sector since single cases allow to investigate phenomena in depth to provide a rich understanding of them ([Walsham, 1995](#)). This choice is also consistent with Yin's suggestion to consider three conditions to choose a proper research method: (1) the type of research

questions posed; (2) the extent of control an investigator has over actual behavioral events; and (3) the degree of focus on contemporary as opposed to historical events ([Yin, 2003](#)). A case study has advantages over other research methods, such as surveys and experiments in answering questions of 'how' and 'why.' Our research deals with explaining how governance modes have influenced innovation at a research library over a period of time. We are interested in a contemporary phenomenon of virtual library innovation within a real-life context as opposed to historical events. In addition, there is broad consensus among researchers that a case study approach is particularly well suited to study the development, adoption and implementation of IT-based innovations in organizational contexts (e.g. [Benbasat et al., 1987](#)).

RUB was selected as single case according to the following criteria: 1) being representative of the Danish research libraries regarding the link between governance, ICT and innovation and 2) been willing to participate to the study. RUB is representative of the virtualization process of the Danish library sector as this process has been enforced top down by policy makers and has involved partnerships and collaboration among all the Danish research libraries mainly through an initiative called DEFF (Denmark's Electronic Research Library Denmark (www.deff.dk)). The data were collected in relation to three research projects. The first project (sponsored by the Danish Research Council, 2004-2007) focused on new organizational forms induced by the societal diffusion of services delivered through ICT networks. The second (sponsored by the Danish Research Council, 2008-2012) focused on user driven innovation., The third (sponsored by Velux Foundation, 2014-2015) focused on ICT, service innovation and governance. One of the author was involved in all three projects, the other only in the last one.

Data sources included secondary and primary data (see Table 2). Secondary sources included a range of academic, government and library studies and reports on the Danish library sector and its virtualization process. This material proved invaluable for understanding the societal, political, governance and technological trends that were affecting the library sector mainly nationally, but also internationally. In addition RUB provided the authors with data such as internal reports, strategic plans, minutes of meetings, user surveys, documents concerning library services and e-services provision. about number of books, journals, employees, physical space at the library (provided by the library and retrieved mostly from RUB and DEFF's websites). Finally the authors also collected statistical data about number of books, journals, employees, physical space at the library both from RUB's employees as well as from Rub's and Danish library authority web sites. These documents were used to support and verify interviews and other primary data.

The primary data sources included qualitative explorative and semi-structured interviews conducted over a period of 10 years to follow RUB virtualization process; organization and participation in meetings with RUB personnel over the period 2008-2012; data generated in three future workshops organized by the authors and involving both RUB personnel and library users in the period 2008-2012; contents of a blog established by RUB in collaboration with one of the authors for idea generation and co-creation with the library users; continuous observations and use of RUB services, e-services, self-services, building facilities. A total of 18 interviews were conducted with top management, middle management and librarians at RUB. Two extra interviews were conducted with two different librarians at other two Danish libraries to get an overall picture of the link between governance and innovation at Danish libraries. The first interviews (relating to the first project) were explorative.

The rest were semi-structured. Most of the interviews were individual except for three group interviews with either two or four participants. We generated field notes immediately after each interview to summarize the key content and to suggest possible interpretations. The interviews lasted circa 1.5-2 hours each, they were all tape recorded and most of them were fully transcribed. The three future workshops (Jungk and Müllert, 1987) were conducted simultaneously at the library premises, lasted three hours each and were tape recorded. The posters and post-it produced by the workshops participants were analyzed and summarized in Excel files and the results presented and discussed in a meeting with library managers. The blog was observed for a period of three months and the data analyzed to understand user involvement and co-creation.

Data Sources (Primary and Secondary)	Number of Interviews or secondary data	Location of the interview or type of source
Interviews		
Interview Positions	Number of Interviews	Organization
Director	1	RUB
Vice Director	2	RUB
Top Manager	5	RUB
IT Director	3	RUB
Front office librarians	3	RUB
Back office librarians	2	RUB
Members of user driven committee (4 members)	2	RUB
Director	1	Research Library at Another University
Librarian	2	Research Library at Another University
		Public Library
Future Workshops	3 (3 hours each)	One with both library users and employees; One with only library users; One with only library employees
Seminars	3	One with user driven committee; One with IT Director; One with middle manager and librarian

Meetings	Several over the period 2008-2014	To plan and implement the blog together with RUB; To plan the three future workshops together with RUB To discuss the results
Blog Content (Interaction between a library manager and user to generate innovative ideas)	Generated over 3 months	RUB
Secondary Data	4 2 3 3 3 3 3 12	Internal reports Minutes of library meetings Results of user surveys conducted by RUB Documents about services and e-services provision/innovation Organizational charts Strategic plans RUB statistics on number of books, journals, employees, physical space Reports and Statistics about Danish Government Policy, DEFF, Library Authority, Danish library landscape
Observation and use of RUB services, e-services, building facilities and Facebook page	Over a 15 years period by one of the author. Over a 1.5 years period by the other author	RUB
Web sites of DEFF, Library Authority and RUB	Visited regularly over the 10 years period	WorldWideWeb

Table 2. Data Collection Activities

At the beginning of each data collection phase (in 2004; 2008; 2014) a contact was established with a top manager of the library. The top manager investigated whether there were other library employees who had an interest in participating in the study. Several managers and librarians expressed their interests to participate. Subse-

quently top management invited other librarians/library managers to participate in the interviews, meetings and workshops with the researchers. The criteria for respondents' selection included involvement in RUB virtualization process at top and middle management level as well as front and back office level (Patton, 1990). Thus the key role that the respondents had in RUB virtualization process gives high level of reliability and validity to the findings. Using our theoretical framework to organize our data, we analyze the case in the transition from New Public Management to Network Governance as well as its implications for innovation activities at RUB with particular focus on service innovation, especially ICT-based innovation. In this process we find some limitations of the theoretical framework and propose some amendments thus making a contribution to theory. The paper has been presented and discussed with one top and one middle level manager at RUB.

5. Analysis and Results

By analyzing our data, we find two phases of ICT-based innovation adoption, implementation and development at RUB, roughly corresponding to a New Public Management period (Phase 1) and to the first manifestations of the networked model (Phase 2). We find that these phases may not be as clear-cut as theorized by Hartley. Nevertheless, they can be associated to rather different innovation patterns, and to distinct roles of policy makers, managers and end users.

5.1 Phase 1: Public governance and innovation- New Public Management

The beginning of RUB's virtualization process largely coincides with what can be dubbed as the New Public Management period, starting around mid 1990's and spanning through the subsequent decade. This phase incorporates some elements of what Hartley calls the Traditional Public Administration period. These elements can be detected especially by examining the role of policy makers and public officers that respectively appear to resemble very closely the functions of "commanders" and "clerks and martyrs" of Hartley's Traditional model. See Table 3 (a) for an illustration of the innovations and the role played by different actors at RUB in this phase.

<i>PHASE 1: NPM (mid 1990s-early2000s) with elements of Traditional Public Administration</i>	<i>PHASE 2: Networked Governance (mid 2000-2014)</i>
<p style="text-align: center;"><i>INNOVATION</i></p> <p><i>Technological Context:</i> Early phase of Internet diffusion; Broad band; High investments in ICT infrastructure</p> <p><i>Institutional context:</i> Establishment of Danish Government's Electronic Research Library initiative (DEFF)</p>	<p style="text-align: center;"><i>INNOVATION</i></p> <p><i>Technological Context:</i> Strong and rapid diffusion of the internet and complementary technology (optoelectronics; new data transmission technology);</p> <p><i>Institutional context:</i> DEFF consolidates as a permanent institution under the Library Authority</p>

<p>Organizational innovation</p> <ul style="list-style-type: none"> - participation to the DEFF consortium, in collaboration with other libraries - moving to a new building in 2000 - increase in number of open stacks; - re-training of library staff - changing relationships between front office and back office - blogs for internal communication - increasing interaction with both the IT and pedagogy departments of the university - improvements in managerial processes with more customer focus <p>Innovation in service delivery</p> <ul style="list-style-type: none"> - introduction of e-Services: E-journals; e-books; e-booking; - book a librarian as an example of customization of services 	<p>Organizational innovation</p> <ul style="list-style-type: none"> - information specialist with special duty in the service journey user driven innovation committee at RUB; - extension of library opening times with possibility of entrance with the library card also when library staff is not in service - establishment of blog for co-creation with the customer; - Facebook as a communication tool; - Back-office changes - Continuous small changes in front line services mainly based on bricolage innovation and on listening to the users' requirements <p>Innovation in service delivery</p> <ul style="list-style-type: none"> - Patron Driven Acquisition - Continuous improvements of services through data analytics and service journey - self-service (self-checkout and self-return) - virtual reference (e.g. electronic chat) - support services for teaching, research and students (assistance with research applications, tailor made courses on library services) - evolution of book a librarian - establishment of a blog to collect inputs from users and co-create innovation - Facebook and workshops used as channels for co-creation of new services - continuous improvements of e-services based on interaction with users through log files and pop-up windows
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Table 3 (a): Public governance and ICT related innovation at Roskilde University Library from mid-1990s to 2014 (part 1)

5.1. Innovation

5.1.1. Technological and Institutional Contexts

From mid-1990s to early 2000s the innovation context was characterized by a) important technological transformations such as the emergence of Internet and World Wide Web, the diffusion of ICT and broad band technology in the Danish society, made possible by important investment decisions of the Danish government whose vision was formulated in the policy plan "Information Society for All" from 1996. This policy plan has been the main driving governmental force of the Danish information society, including the digitalization of the libraries to provide all the Danish citizens with access to electronic resources. b) Institutional innovations such as Denmark's Electronic Research Library (DEFF) established for the facilitation of the innovation and development of library electronic services and overall objective of improving the use of ICT in support of research and education.

5.1.2. Organizational innovation

At the end of the 1990's -beginning of 2000s RUB starts an organizational innovation process involving several dimensions of change and especially enacted through different major initiatives. First of all, in 2001 RUB moves to a new, modern library building with double the size of the old one providing a more attractive look, as well as much more shelf and office space. The new building facilities allow the increase in the number of open stacks relative to closed stacks, thus increasing the number of library resources that can be accessed directly by the library users, therefore laying the grounds for an increase in library self-services. This period is also characterized by an increase in partnerships and collaboration with several national and local actors. The most important of these initiatives is RUB's participation to the DEFF consortium. This implied the establishment of partnerships with different Danish research libraries with the common purpose to innovate the electronic services and library services both at national level and local RUB level. Such partnerships and service innovations were partly financed by government funding and partly by joint purchase of licenses (www.deff.dk). DEFF's initial strategy was:

"To improve the end user's access to information through cooperation between the Danish special and research libraries. The cooperation includes joint development in cases where cooperation will result in a greater advantage than the sum of local initiatives, including a better and total utilization of the libraries' resources; further development of the joint network of information resources; collective dissemination of the research libraries' information resources to the public" (www.deff.dk, *retrieved February 2007*).

In this period RUB also starts collaborating with the IT service department (Campus IT) and the department of education at Roskilde University and to start developing e-learning (Scupola, 2009). This collaboration was mainly desired by top management at Roskilde University (but originating from policy statements) due to two major trends: a new vision that research libraries had to become an integral part of the university organization; budget constraints both at Roskilde University and RUB level. These organizational innovations implied changes in staff competencies with heavy

re-training of RUB's staff and changes in front office and back office tasks. In the attempt to cope with these organizational changes, RUB introduced an additional organizational innovation: the establishment of a blog to support the internal communication of RUB employees and to facilitate their knowledge exchange. This was an important change in line with the transformation of RUB towards a virtual library with the benefits and resistance that such ICT-based innovations may generate (Interview with a top manager, Spring 2008).

5.1.3. Innovation in service delivery

The most radical innovation in service delivery at RUB in this period is the introduction of e-services, that is the possibility of searching, browsing and retrieving needed information remotely and instantly from the users' own computers, anytime, anywhere through the use of the World Wide Web, thus providing access to e-journals and e-books 24/7 all the year around. This was perceived as a major change at that time as it implied that the library users could themselves download the journal articles or book chapters from the library web page without necessarily needing to go to the physical library. Simultaneously RUB started innovating its face-to-face services in accordance to a shift to a more market and customer centered strategy and to an increase in the customer focus. For example RUB had conducted 2 user surveys, one before and one after moving to the new building in 2001 in order to measure customer satisfaction with their service provision. Since the survey conducted after the move to the new building showed a decrease in customer satisfaction, RUB at the initiative of 3-4 librarians developed a new service concept, "book a librarian", which can be seen as one of the first examples of services customization at RUB. This service consists of offering the student individual instruction and support in literature and information retrieval within the specific subject/field of the student or project. The librarian can for example offer help in choosing appropriate search strategies, choosing relevant databases, guidance in selecting and evaluating relevant sources and internet resources, advice in keeping track of the literature used in the project (http://ask-rub.altarama.com/reft100.aspx?key=bookbib_en, retrieved Spring 2013).

5.1.4. Role of Policy Makers

The case shows that in this period policy makers mainly play a role of announcers of societal changes and innovation through the formulation of policy directives, but they also act in a way that much resembles the "commanders" typical of Hartley's Traditional Public Administration model. For example they act as announcers in the Danish government vision and policy plan "IT society for all". However, Danish policy makers act as commanders when in May 1996 the Ministry of Culture, the Ministry of Education and the Ministry of Science established an IT working group to investigate the transformation of the research libraries into electronic research libraries. In 1997, the "DEFF report" was published, creating the basis for potential partnerships for the Danish research libraries' IT development. The "DEFF report" described a model of reference for Denmark's Electronic Research Library including the essential electronic functions and services to be delivered by such libraries. A budget was then allocated by the three ministers involved, a board of directors was appointed, and a vision and a strategy for the DEFF project were developed. In 2003, DEFF became a permanent activity with the objective of improving the use of IT in support of research and education.

<p>PHASE 1: NPM (mid 1990s-early2000s) with elements of Traditional Public Administration</p>	<p>PHASE 2: Networked Governance (mid 2000-2014)</p>
<p>Role of Policy makers</p> <ul style="list-style-type: none"> - Act mostly as announcers, but also as commanders. - The info-society for all (1996) creates the guidelines for the starting and evolution of the Danish IT society (Announcers). - Establishment of DEFF (Commanders) 	<p>Role of Policy makers</p> <ul style="list-style-type: none"> - Act as leaders and interpreters of the societal trends, also involving the users in policy development - Define the guidelines for continuously changing the library landscape through policy initiatives such as user driven innovation (see Ogawa et al., 2011). -
<p>Role of Public Servants (library managers and workers)</p> <ul style="list-style-type: none"> - Some librarians become top level/middle managers - top level and middle managers implement the changes dictated by the policy directories at local level to minimize costs due to budget constraints - Librarians and clerks become “martyrs” due to the changes in competences/job descriptions that such policy directives imply in their local enactment. 	<p>Role of Public Servants (library managers and workers)</p> <ul style="list-style-type: none"> -RUB managers (both Top and Middle level) act as explorers through a number of initiatives (e.g. “user driven committee”; a blog for the co-creation of new service ideas; co-creation workshops; supervision and teaching sessions). -Recognition that innovation ideas come from everywhere in the organization. -Top management provides inputs to RUB’s strategy and development plans and are the leaders in the most radical RUB’s innovations; - Middle management and front line employees develop many small incremental innovations (bricolage). Some suggestions may be taken to top management through the biweekly meetings of the coordination committee, and get approval for implementation throughout the whole organization
<p>Role of users</p> <ul style="list-style-type: none"> -The library users still considered to be fairly homogeneous and a relatively static “client” - Every 5 years get involved with a survey about the library service. 	<p>Role of users</p> <ul style="list-style-type: none"> - The library users become an important source of innovation ideas: their needs/ wants/ wishes and behavior are captured and interpreted by librarians in different institutionalized circumstances (e.g. Service Journey; User Driven Committee; supervision and

	teaching sessions; virtual reference sessions) - involvement of users in new service development through social media and workshops. - The user plays three roles: “re-source”; “user” and “co-creator” in the service innovation process.
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Table 3(b): Public governance and ICT related innovation at Roskilde University Library from mid-1990s to 2014 (part 2)

5.1.5. Role of Public Officers/Servants (library managers and workers)

The examined period is characterized by a transformation of the role of RUB top management and some librarians into “public managers”. The re-organization of RUB’s organizational structure into a matrix organization implies that some librarians act both as top or middle managers (with related decision power), while simultaneously keeping their role of librarians with front desk responsibilities. In the role of top level managers, such library employees implement at RUB level the changes dictated by the university, government, DEFF and Library Authority. They act both as efficiency maximizers and cost minimizers, especially due to the pressure from cutting costs in the public sector coming from both the Danish government and Roskilde University management. They are also responsible to implement the changes envisioned by DEFF at local RUB level, thus engaging into partnerships or collaborations on specific projects with other Danish Libraries. However, while some librarians take on the roles of top and middle managers, other librarians and library clerks become in a sense “martyrs”. RUB virtualization has imposed substantial changes in competencies, tasks and working procedure placing a remarkable increase of pressure on library employees. that are increasingly required to do more with less. For example from the statistics on the number and types of library employees published on RUB web site (<http://rub.ruc.dk/en/>, retrieved summer 2014), one can see that while the number of librarians and subject specialists has been more or less constant in the decades from 1994-2014, the number of clerks has been cut by half by 2014. This is explained by the following statement: „*The spectrum of work for academic staff is widening and taking on tasks that earlier were done by clerks. ..So there are fewer tasks for clerical staff and therefore less clerical staff.*“ (Top manager, RUB, summer 2015)

In accordance to Hartley’s model, this period is also characterized by emerging competition among top managers of different Danish libraries, as “you want to be a little bit better than your neighbour library” (Director of reader services, RUB, spring 2009).

5.1.6. Role of users

The library user in this period is still considered to be fairly homogeneous and a relatively static kind of client, even though some examples of service customization are emerging as in the case of “book a librarian” (see above). This is reflected in the fact that the customer’s wishes and wants do not play a big role in the library innovation activities yet. The only ways in which the library takes into consideration the users’

needs and wants is by conducting a survey every 5 years, and through the customer complaints box. The self-service philosophy introduced in this period is based on the idea of letting the user choose out of a fixed menu of alternatives. The users are not involved in designing the alternatives to choose from. The users are perceived to be mostly generators of smaller, incremental innovation ideas as the following statement shows: “It is limited how much the users may contribute with ideas.. Well it is smaller suggestions, they are not trivial, they can be just as legitimate, but they are not high-flying” (Top manager, RUB, Spring 2008).

5.2 Phase 2: Public governance and innovation-Networked Governance

The Networked Governance period, which for RUB starts in the mid-2000s, is characterized by continuous, still on-going changes.. Such changes concern especially the innovation context as well as an increased focus on customization and co-production of library services. This implies an overall change in library support services as the Danish Library Agency states in a report of 2008:

“Such library support will entail a shift in focus from supporting the creation of truth to supporting the creation of value. This might mean a stronger focus on supporting inspiration and new ideas as opposed to focusing on quality in support of the search for truth (Danish Library Agency, 2008).”

Table 3 (b) summarizes the innovations and the role played by the different actors in this phase.

5.2. Innovation

5.2.1. Technological and Institutional Contexts

The technological context in this period is characterized by a capillary diffusion of the Internet and complementary technologies in the Danish society, government and business organizations. The institutional context, instead, is characterized by a transformation of academic institutions such as universities towards business like organizations, with a board of directors and activity based budget. In this period Danish universities experience an increased focus on strategic management and strategies development. The Danish universities experience a shift from elected to appointed vice-chancellors as well as deans and vice-deans (Danish Library Agency, 2008). Although the emphasis on business like procedures could be seen as a manifestation of the NPM approach, being this institutional change associated with a decentralization of decision making in the innovation area, makes it more consistent with the networked governance model.

5.3. Organizational innovation

RUB’s organizational innovation in this period is focused on how to best understand and meet the customer needs and wants. In this period and especially in response to the policy initiative “User Driven Innovation”, RUB for example establishes the “user

driven innovation committee” with the specific task to understand the user needs and provide ideas on how to innovate the library services accordingly. More recently this committee has been replaced by an information specialist responsible for the service journey and how to improve it. For example this information specialist followed the service journey of the use of the library scanner and came up with suggestions on how to improve it. In addition, RUB has extended its opening hours until midnight all the year around. This is possible because the users can access the library with the library card when the library staff is not in service (). In this period RUB has also implemented a number of organizational changes in the back and front offices (front desk), to meet the organizational requirements dictated by the increasing electronic services and self-services provision. Especially front-desk service innovations are very important in this period. Such innovations are often developed bottom up by the library employees and approved by top management as for example the case of book a librarian or the chat service. However a lot of smaller incremental service innovations (improvements) take place at front desk and middle manager levels without the involvement and/or approval from top management. These continuous small changes in the services and/or service delivery process are mainly based on bricolage and often discussed at lunch time among librarians and front desk employees, thus contributing to their diffusion within RUB (e.g. Fuglsang, 2010). Bricolage innovation takes place as a means to satisfy the users, but also to make employees own work practices easier. Finally RUB has been experimenting with the creative use of social media such as blogs and Facebook in an attempt to get closer to the customer, engage into a two ways communication, and involve them idea generation and co-creation of innovations.

5.3.1. Innovation in service delivery

This period is characterized by radical and incremental innovations in RUB services and service delivery, but also by “new service development” especially in support of teaching, research and students. For example the librarians (subject specialists) can provide assistance to Roskilde University faculty with research applications by helping for example with a literature review. After suggestions from the users (faculty staff), RUB has introduced tailor made courses for teachers and students on how to use reference programs such as End Notes, REFWorks and Mendely. RUB has established a coffee vending machine in response to the user (student) wishes to be able to get a cup of coffee while in the library. Some service innovations are conceptualized, initiated and developed locally at RUB with or without user involvement (as the examples above), others take place within the broader context of DEFF as for example the “Library Call Service” (“Bibliotek vagt”), initiated by DEFF in an attempt to harmonize access to information help across the public and research libraries and successively designed and implemented locally at RUB. In this period the focus gradually shifts towards self-service of e-journals and e-books, self-checkout and self-returns of library material as well as the use of the library physical facilities with access card when the library is not staffed. The content of the service is increasingly driven and co-created by the user as in the case of the “Patron Driven Acquisition Service”, a user driven service allowing immediate access to the user (against a fee charged to RUB) to articles or books that are not in RUB’s collection. This is clearly evidenced by the following RUB’s statement:

“The library service is based on the principle of extensive self-service and access to open stacks. Self-checkout and self-return stations are located near the exit. All users are responsible for observing due dates and renewing and reserving material.

It's possible to pay fees and bills through your library account.” (<http://rub.ruc.dk/en/about-library/the-library-from-a-to-z/>, downloaded summer 2014)

5.4. Role of Policy makers

The policy makers in this period act as “leaders” and “interpreters of the societal trends”. They define the general policies for the continuous innovation of the service provision in the public sector. An important policy initiative that has influenced many sectors of the Danish society including the library sector is the “user driven innovation” policy of the late 2000’s. This initiative has been introduced by the Danish government to encourage public administrations and private organizations to involve the citizen/customer in innovation processes and activities (e.g. Ogawa et al., 2011).

5.4.1. Role of Public Servants (Library Managers and Workers)

In this period RUB managers take on the role of “explorers” by engaging in a number of activities aimed at innovating the library services based on high level of user involvement and co-creation.). Top management, however, still provides inputs to RUB’s strategy and development plans and is the initiator of most radical innovations by implementing at local RUB level the information policies developed by the library authority DEFF and the government. For example Top management has taken the initiative to adopt the “Patron Driven Acquisition Service” described above. RUB’s middle managers and front desk employees develop small incremental innovations (bricolage) that remain at the middle-management-front desk level. Some suggestions are taken to top management through the biweekly meetings of the coordination committee, and sometimes they get approved and get implemented in the whole RUB. Examples of initiatives where RUB managers act as explorers are: the service journey; the use and analysis of the activity data of the users (data analytics) for service management and innovation; the “user driven innovation committee”; the establishment of a blog and conduction of future workshops for the co-creation of new service ideas with the user; the use of supervision and teaching sessions to get inspiration on how to improve the library services and their provision; the use of log files, electronic positive and negative feedback and pop-up windows to understand how to improve RUB’s electronic services.

5.5. Role of users

In this period, RUB experiences a shift in the role of the user from being a static entity to become more active and central in the service innovation process. The role of the user develops from being passive or what Nambisan (2002) defines as “resource” (e.g. mainly answering a survey), to being “a co-creator”. In addition the users contribute to the service innovation process by just using the services (the “user” role) and electronic services as their behavior can be captured by log data or electronic sensors and analyzed with data analytic techniques to make conclusions about service innovations. RUB also involves students working at the library to test a new service or improved service before lunch improvements. Users start being integrated in the New Service Development of library services by taking an active role in ideas generation and co-creation as in the blog and future workshops initiatives. These initiatives have led to innovations such as the coffee vending machine or establishment

of library group rooms. In addition, the continuous improvements of the “book a librarian” service and the “virtual reference” service more and more user-driven; including the electronic chat are driven by the users through their difficulties, complaints and suggestions. , This reveals a fundamental change in perspective: from the choice out of a fixed menu, to the actual design of the menu, i.e. the user is highly involved in the co-creation of the service, by adding new quality and content to the service that is being delivered.

6. Conclusions and implications

The paper has taken inspiration from Hartley’s seminal contribution to develop some reflections on how technical and organizational transformations combine with changes in the roles played by policy makers, public managers and users in the development of public sector innovation. Using a case study on the Roskilde University Library to illustrate these patterns, we have highlighted three important aspects that characterize the links between governance and innovation in this field.

First, the examined case shows that the organizational complexities have increased in the transition from what could be considered as a spurious NPM model, incorporating elements of the traditional hierarchical model and elements of market-like competition, towards a “networked model” implying more emphasis on bottom-up decision making and a greater involvement of end users. The variety of government policies and instruments has considerably widened, public managers have increased their relative capacity to take relevant decisions on innovation uptake and new service development, library employees have become more involved in this process with a more active role to play.

Second, we have provided evidence of increasing co-creation activities in which end users are involved not only in choosing out of a given menu of alternative solutions to given problems, but also in the definition of the menu itself, and in shaping and implementing innovative solutions.

Third, the increasing involvement of users has created important innovation opportunities that are more and more characterized by their frugal/bricolage nature, hence more localized but not necessarily trivial and relatively easy to diffuse to different contexts.

As in the case of other case studies, ours can hardly lead to generalizable conclusions. However, it can be expected to provide useful insights on ongoing changes that would be more difficult to capture otherwise. Future research might benefit from a deeper analysis of the issues emerging from this experience of virtual library development.

7. Appendices: Roskilde University Library key figures

Building size (m2)

Year	Public area	Offices	Closed Stacks	Other	Total
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2001–2012	4.500	930	845	1.725	8.000
1991–2000	2.120	710	610	600	4.040

Collection (No. of items)

Year	Books	AV-media	Serials	Total
2013	643.911	217.927	—	861.838
2012	641.183	217.852	—	859.035
2011	637.145	216.483	—	853.628
2010	631.835	215.901	—	847.736
2009	624.594	215.461	—	840.055
2008	618.543	214.680	—	833.223
2007	611.768	214.240	—	826.008
2006	605.227	213.500	—	818.727
2005	596.687	213.034	—	809.721
2004	588.896	212.302	—	801.198
2003	577.652	210.896	—	788.548
2002	562.962	215.581	—	778.543
2001	552.926	215.713	4.106	772.745
2000	545.307	213.813	4.610	763.730
1999	532.114	210.490	5.101	747.705
1998	517.554	207.453	4.698	729.705
1997	501.220	198.833	4.760	704.813
1996	487.555	196.858	4.894	689.307
1995	475.683	183.942	4.872	664.497
1994	457.079	172.415	4.824	634.318

Serials not included from 2002

Collection (Shelf meters)

Year	In stacks	On open shelves	Total
2013	8.120	10.900	19.020
2012	8.080	10.900	18.980
2011	7.950	10.900	18.850
2010	7.560	11.200	18.760
2009	7.423	11.200	18.623

2008	7.361	11.200	18.561
2007	7.455	11.200	18.655
2006	7.540	11.200	18.740
2005	7.712	11.200	18.912
2004	7.458	11.200	18.658
2003	7.120	11.200	18.320
2002	6.834	11.200	18.034
2001	6.600	11.200	17.800
2000	8.451	6.800	15.251
1999	8.322	6.600	14.922
1998	7.903	6.600	14.503
1997	7.211	6.800	14.011
1996	6.815	6.800	13.615
1995	6.484	6.700	13.184
1994	6.022	6.600	12.622

Circulation

Year	Loans	ILL	ILL (received)	Total
2013	99.396	43.543	5.150	148.089
2012	104.898	44.492	5.805	155.195
2011	110.667	44.793	6.310	161.770
2010	114.017	40.825	6.758	161.600
2009	121.259	43.193	6.698	171.150
2008	127.864	38.159	7.696	173.719
2007	129.661	31.291	7.777	168.729
2006	147.393	35.811	9.263	192.467
2005	165.854	35.826	11.176	212.856
2004	168.197	32.122	11.354	211.673
2003	172.503	37.099	11.984	221.586
2002	168.020	34.947	10.884	213.851
2001	337.470	27.883	11.264	376.617
2000	350.495	28.539	12.521	391.555
1999	333.937	27.897	11.011	372.845

1998	297.231	26.244	10.592	334.067
1997	289.468	21.692	10.809	321.969
1996	264.171	21.409	9.298	294.878
1995	246.860	17.876	9.075	273.811
1994	237.066	16.726	7.737	261.529

Figures from before 2002 include photocopies and renewals

Document downloads

Year	From own servers	From external servers	Total
2013	3.191.341	896.401	4.087.742
2012	1.023.277	807.988	1.831.265
2011	695.000	771.059	1.466.059
2010	897.422	535.451	1.432.873
2009	563.117	537.282	1.100.399
2008	904.710	475.521	1.380.231
2007	794.445	514.369	1.308.814
2006	261.748	617.748	879.496
2005	237.262	459.520	696.782

Staff

Year	Subject specialists	Librarians	Clerical staff	Other staff	Total
2013	9,6	11,3	8,7	6,7	36,3
2012	8,9	11,0	10,2	6,3	36,4
2011	10,1	12,4	10,7	7,8	41,0
2010	9,3	10,0	14,0	8,0	41,3
2009	9,5	10,1	13,0	8,0	40,6
2008	9,5	10,1	13,0	8,0	40,6
2007	9,5	12,2	14,0	8,0	43,7
2006	9,6	13,2	14,8	8,0	45,6
2005	9,6	12,9	14,5	8,0	45,0
2004	10,0	13,3	14,5	8,0	45,8
2003	10,0	13,3	14,6	7,5	45,4
2002	11,7	12,1	16,3	7,1	47,2
2001	11,7	12,1	16,3	7,1	47,2

2000	12,5	13,0	16,5	8,7	50,7
1999	12,3	13,0	16,5	8,5	50,3
1998	12,3	13,0	16,5	7,5	49,3
1997	11,6	14,5	16,6	7,5	50,2
1996	10,6	15,0	16,1	7,0	48,7
1995	10,6	14,5	14,5	6,1	45,7
1994	10,6	12,4	16,5	5,0	44,5

Budget

Year	Staff	Acquisitions	Other expenditure	Total
2013	16.908	9.428	2.645	28.981
2012	16.444	9.474	2.095	28.013
2011	18.070	9.426	2.519	30.015
2010	18.215	9.773	2.467	30.455
2009	17.272	9.264	2.709	29.245
2008	17.303	8.725	2.267	28.294
2007	17.194	8.626	2.639	28.459
2006	16.883	8.827	6.721	32.431
2005	16.558	8.311	3.607	28.476
2004	16.107	5.646	3.620	25.373
2003	15.906	7.849	3.171	26.925
2002	15.895	6.103	3.687	25.685
2001	15.948	9.137	8.294	33.378
2000	15.359	7.529	3.924	26.812
1999	14.827	8.631	6.432	29.890
1998	15.184	7.522	3.705	26.410
1997	13.957	7.715	3.166	24.839
1996	13.236	7.254	4.859	25.348
1995	12.100	5.331	3.559	20.990
1994	11.946	5.377	3.096	20.419

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Innovation in retail: impact of mobile phone on consumer behaviour

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Abstract

"...as consumers adopt new technologies, their behaviours change" (Zinkhan & Watson, 1998). With the development rapidly of the smartphone and the wireless network from decades, consumers use more and more frequently their mobile phones to purchase and/or reserve the goods and services, that's why the mobile commerce is growing to a field which cannot be ignored by the managers and the researchers. However, it still remains at the period of his infancy in the retailing industry and there are too many papers concentrate on the technology acceptance model of m-commerce, but few of them pay attention to the context of using the mobile phone. This paper aims to: (1.) discover the context of use of m-commerce for the chain hypermarket clients in France by identifying the critical factors in different phases of m-commerce; (2.) try to understand the importance of the mobile service by analysing the interactions between the retailers and the customers in each phase and (3.) to find out the change of the consumer behaviour in this brand new business model. This study reports an exploratory qualitative method by interviewing the mobile customers in France.

Keywords: Mobile commerce; Mobile service; Mobile context; Interaction; Customer behaviour; Chain hypermarket in France.

1. Introduction

Currently there are 6 billion mobile phone users in the world, and 1 billion smart phones, the figure will be DOUBLED in 2015. The mobile phone penetration rate is from Macau in China with 236% and 105% in the United States, 102% in France. With Big Data is collected by the e-commerce, we can understand consumers' behavior such as seeking out its fields of products, scan products to stores, buying, etc.

The products and the services offering by the mobile and the wireless network engage the development of the M-commerce which is becoming a global subject. 'The developments within m-commerce is subject to two major technological advances; the growth surge of smartphones and instant high speed mobile internet access (ZHANG et al, 2013). In France, the possession of smartphones is 55% and the number will grow constantly in the next few years, because the rate of possession is already reached by 69% in USA and 74% in England respectively. And the most impressive phenomena are the m-commerce represent 3.7 billion euro in 2014 and it will increase to 7 billion by 2015 which will be the 12% of the e-commerce (Source: Centre for Retail Research). This drives more and more researchers to focus on this topic, 'Although a large volume of literature is available on mobile commerce (m-commerce), the topic is still underdevelopment and offers potential opportunities for further research and applications' (Ngaia & Gunasekaran, 2007). Even there exist some papers of M-commerce adoption, but 'Context is an inherent part of service use experiences that helps to understand when mobile services generate superior value-in-use for customers and are preferred to other services, but little research exists on the subject'(Gummerus & Pihlström, 2011). The traditional consumers used to purchase in the face to face context and the e-commerce make the context more divers. The online customer experience (OCE) can help managers to raise the consumer's loyalty. (Rose, Hair & Clark, 2011) But, M-commerce will change completely the purchase context by making the channel fragmentally. It's hard to catch the consumers if the retailers don't know the new context. So, we are going to find out the use context of M-commerce and define the different phases of purchasing for the retailing industry because 'To safeguard their existence in the face of harsh competition, food retailers have shifting their attention from goods to service. In this development, mobile services have emerged as suitable venues for intensifying companies' service orientation.' (Saarijärvi, Mitronen & Yrjölä, 2014). Is mobile phone making services of retail become better than before, the Importance of the interactions between the retailer and the consumer will be analyzed in this paper.

Mobile commerce is a new service in the background of the development of information technology innovation. Service output in Europe and developed countries accounted for more than 70% of GDP, and it will be enhance in the future. This caused the interest by a large number of scholars and companies, to carry out the deepening research of the service. One of the most prominent participants is IBM who proposed the concept of SSME (Service Science Management and Engineering). They hope to develop the technologies needed in service industry by combining the cloud computing science; marketing; industrial engineering; business strategy; science of management; social and cognitive research; science of law and so on. However, before that, the academic research on service industry is extremely rare compared to the production industry. So, we are going to present the M-commerce and the service.

2. Conceptual Framework

2.1. Use context

People carry their smart phones or mobile devices (as iPad, etc.) to anywhere they go at any time. Following the data from Compete, 63.2% of shopping activities took place at home, 34.5% consumers use their mobile devices in store to compare the price, watch the comments or download the coupon, and 28.6 of them purchased in their fragmented time such as the bus station, coffee shop and so on. They could search for information, enjoy the entertainment applications, communicate with others, and purchase or reserve the products/services without the limit. All of these new concepts or technologies are becoming a very important part of our daily routine, which means the new context of commerce activities are also coming into our life. The context, especially with regard to mobile applications, is seen as an important variable, and due to the possibility of developing context-aware or location-based services in the mobile domain, the concept of context has received more and more attention (Bouwman & Wijngaert, 2002).

Then, if mobile services are to come up with real added value to the user experience, developers have to understand both the concept of mobility, as well as the context of the use of mobile applications (Bouwman, Bejar & Nikou, 2012). First of all, we have to understand which factors compose the context. To better understand the impact of context on consumers' behavior, particularly in terms of technology-based services, researchers have called for more research on contextual factors (Dabholkar & Bagozzi, 2002). To better understand the contextual factors, the service use outcome in the model of the service production process was discussed, because the relationships between the context and the service use outcomes is important (Chell, 2004). Following the previous research, context can be divided to Computing context, user context, physical context (Schilit, Adams & Want, 1994) and time context (Chen & Kotz, 2000). Computing context refers the basic technologies of mobile commerce such as the Wi-Fi access, the communication costs and so on. User context means normally the social situation of consumers. Physical context refers the environment condition including the temperature, the traffic condition. Time context refers to e.g. day, week, or month (Chen & Kotz, 2000). Some services clearly fit some context while other services do not. It is therefore important to categorize services quite carefully, and to relate them to contextual aspects (Bouwman, Bejar & Nikou, 2012).

In this paper we focus on the retail industry, because traditional retailers are increasingly shifting their strategic focus from goods to service (Saarijärvi, Mitronen & Yrjölä, 2014). As we said, the new daily routine of shopping is coming to us, consumers' comportments and purchasing decisions are now revolutionary changed thanks to the penetration of smartphone. Consumers don't need to go shopping anymore; they are doing it all the time at all the places. They can find and reserve the products or services at many scenes even when they are busy, they can give orders by phone through the purchase process. This revolution has given consumers the right to speak and brings the challenges for retailers to find the new model to meet new customers' behavior. In the context of retailing, they began to realize the situation and tiring to introduce M-service for the new cycle of purchasing.

Varley & Rafiq proposed in (2005) that retail services is customer service, including a variety of additional value-added services through interactive offered by sales staff, the implementation of commercial policy and the facilities provided by retailers. The initial service innovation, mainly through the introduction of advanced technology and equipment, such as fast cash system and convenient bag storage systems, but consumers' demand changes to the spiritual level, the service began to consider the innovation of diversification for the various departments.

Consequently, M-services become more and more important for retailers by provide the personalized shopping experiences to their consumers with the persist information (Nysveen et al., 2005). Current research specific to the retailing context, shows that consumers who own a smartphone perceive social media and other applications provided by the retailer as valuable in the in-store environment (Sands et al., 2011). In conclusion, integrating research on M-services with the recent theoretical discussion around service as business logic offers clear synergic outcomes (Heinonen and Strandvik, 2009).

In retail industry, there are two kinds of mobile apps for the use context. One of them is developed by the independent application developers like 'Shopkick', it was designed by an independent company who offer the service for the retailers like Best Buy, Macys, American eagle, etc. They use the LBS (Location Based System), the coupon which could get from 'kickbucks', scanning function to make consumers purchase easier and funnier. Amazon has the same application which focuses more on the price compare function.

Another kind of apps was developed by retailers themselves. Like Walmart developed his own apps and it could switch to 'in store model' automatically when customers enter into one of Walmart, and they will receive the information of new products or promotions, they could reserve the products if they are sold out. In France, retailers developed also their own apps because they caught the tendency of retail's future. We are going to make a list of these apps with their functions to understand the factors of use context.

Retailers		Auchan	Casino	Carrefour	DIA	Monoprix	Leclerc	Lidl	Walmart
Functions									
Information service	Catalogue	○	○	○	○	○	○	○	○
	Promotion	○	○	○	○	○	○	○	○
	Scanning	○	○	○		○			○
LBS	My store	○	○	○	○	○		○	○
	Accurate search in store			○		○			○
Personal Assistant	List of shopping	○		○		○			○

	Member card management	○	○	○		○			○
	Contact with seller	○		○		○	○		○
Payment		○	○	○		○			○
Social media		○		○				○	○

We can observe through the list that information service is the most basic function for the retailers, in the function of LBS, the location for store is used by most of retailers and the accurate search in store is still under developed. The management of member card and payment are also popular in the context, the contact with seller and social media are the factors of interaction, they are popular but not well used by some retailers.

2.2. Mobile service

The huge potential in delivering m-services through mobile devices created by the combination of rapidly developing technology and high uptake rates of mobile devices has been recognized for more than a decade (Bitner et al., 2000). M-services are understood here as mechanisms through which food retailers can enable their strategic shift toward serving their customers (Saarijärvi, 2012). As the application of new technology, the M-commerce and his innovative services have a lot of features. The researches of the key factors for the high-quality mobile services with excellent customer perceived, technology platform for mobile services, service model, service delivery methods, as well as the changes of consumers' behavior, make us understand better the value of mobile commerce.

The definition of the service is still a controversial topic, because the services are too complicated, it makes the understanding of the services become blurred and contentious. So far, the service has no precise definition. Services include both the traditional labor-intensive services, and the modern knowledge-intensive and technology-intensive services with the development of information technology. Services can be categorized in many different ways. Some services can be characterized as communication services, and others featured as information, entertainment or transaction services (Bouwman, Bejar, Nikou, 2012).

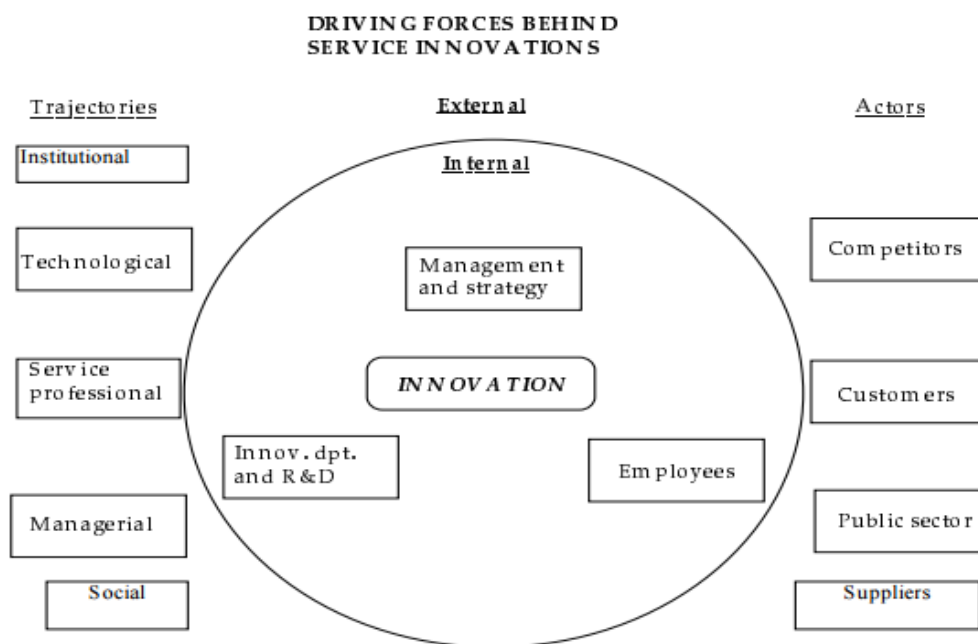
In addition, there are many different definitions of service. However, the definition above just give some characters of services, these definitions are always unclear for the particular service sector. Especially, the new business model such as mobile commerce needs a more vivid and more targeted description of the service. Thus, this paper tries to analyze the services offered by the retailers in France via mobile phones. Mobile commerce includes not only the products but also the good quality service offered by the retailers, such as the precise information, the products' scanning function, the reservation ubiquity, after-sell service and the social share experi-

ence, etc. In some cases, mobile services are even more useful to attract and keep the consumers than the products.

2.2.1. Interaction between customers and retailers

Because of the intangible and uncertainty of services, many scholars doubt innovation of services, they think the service is an adjunct of tangible product and service innovation itself does not exist. In addition, the relations between service innovation and technological innovation was discussed, do they have the same process, nature, mechanisms and effects. Currently, the debate over whether the presence of innovative services to generally agree: innovation in services exist, but the form is very different with technical and organization innovation. It exist almost no services without tangible elements, at the same time, there is little tangible goods don't include the services (Christopher H. Lovelock, 2001).

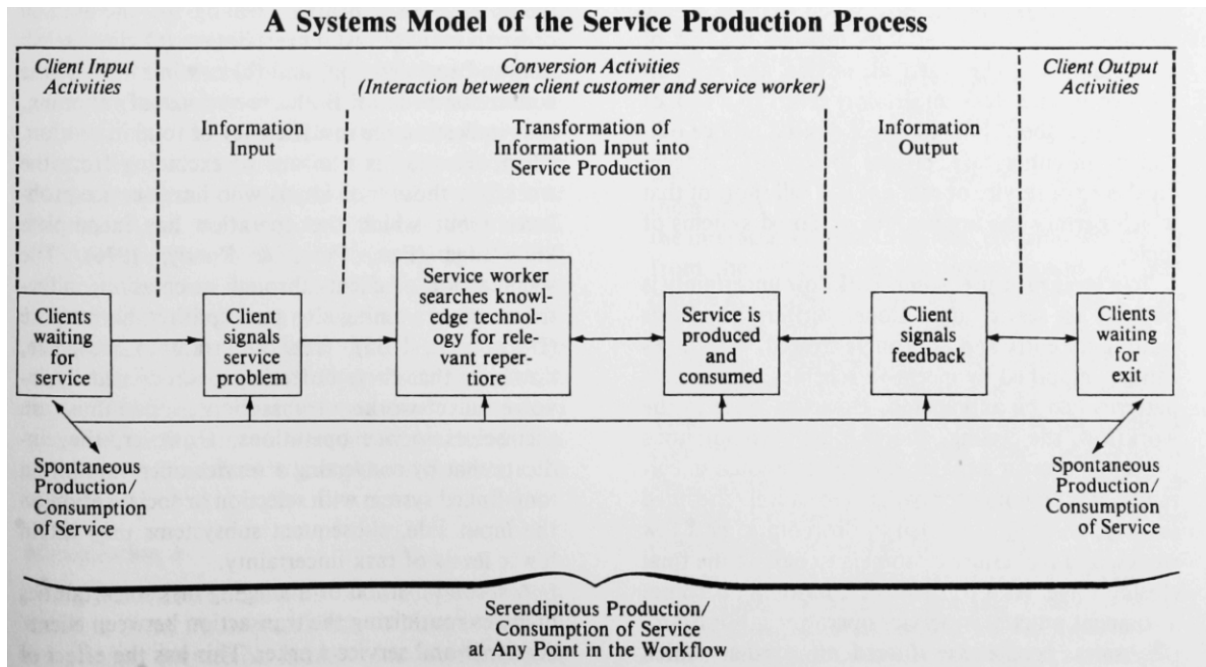
Retailers need to make the service innovation activity and strategy; they must first clear the basic driving forces of innovation in services. Sundbo & Gallouj (1998) analysed the services with a number of European countries and they proposed a model of the driving forces:



We can see that customers are one part of actors, following Gummerus & Pihlström (2011, pp. 521–522), M-services can be defined as ‘content and transaction services that are accessed and/or delivered via a mobile handheld device (PDA, mobile, cellular or phone, GPS, etc.) based on the interaction/transaction between an organization and a customer’. So, in M-commerce environment, customers participate in the production of service more frequently than before, research on customer participation and their influence to the production and delivery process of service gradually increased (Bendapudi and Leone, 2003; Ennew and Binks, 1999; Hsieh and Yen 2005; McCollough et al, 2000; Yen et al., 2004). Consequently, M-services become more and more important for retailers by provide the personalized shopping experiences to their consumers with the persist information (Nysveen et al., 2005).

2.2.2. Service production process in M-commerce

Mills & Moberg (1982) proposed a systems model of the service production process to explain the interactions between the consumers and the service workers through the service production process in the traditional commerce environment.



Service production process and the manufacturing process are very similar. Therefore, the principle of the management of manufacturing operations with some management experience can be used to manage service processes. However, due to the characteristics of the service, management and operations of services have a different process. Like participate of customers, customers could get satisfied by the quality of the relationship with service person, and to determine the quality of service. Through m-services the company can create interactions with its customers, engage with their value-creating processes and deliver additional resources for their use (Grönroos, 2008a; Grönroos and Ravald, 2011).

The purpose of M-service is to find customers current and future needs, then design the programs to meet the customer's needs, including mobile services, service delivery methods and experts support. Then try to provide the faster, more comprehensive services to customers with an unprecedented shopping experience. The company is able to interact with customers via a variety of m-services that assist customers in their everyday processes beyond the traditional boundaries of food stores (Klabjan and Pei, 2011).

Mahatanankoon et al. (2005) define that M-commerce includes information services (google, yellow pages, etc.), transactions, location-based services (e.g. the receipt of discount coupons in a local store, etc.), support services (emergency) and entertainment. If a retailer can offer all these services, they will keep their customers' loyalty.

2.3. Consumers' behaviour

Consumers' behavior in a traditional commerce environment influenced by consumers' internal characteristics (including personalized preferences, interests and emotions) and external environment (including social, cultural, marketing activities, etc.). This behavior is totally different from a mobile commerce environment. So, we are going to present and compare the consumers' behaviors in traditional commerce, E-commerce and M-commerce environment.

2.3.1. Consumers' behaviour in traditional commerce

There exist a lot of theories and models of consumers' behavior in traditional commerce environment such as the Habit Formation theory, Information Processing theory, Risk Reduction theory and Marginal theory which can explain the consumers' buying behavior. Then, the researchers provided some classic models such as:

- Nicosia Model, 1966

Francesco Nicosia proposed this model in his book 'The process of purchase decision of consumers' in 1966. It describes the sequence of the information processing without detailing the different stages that comprise it.

- Lotler Philip model, 1973

It is the basis of purchase decision process of consumers and there are 4 parts: Need recognition, Search for Information, Pre-purchase evaluation, Purchase. The purchase decision is not only influenced by domestic factors but also external, throughout the influence of corporate marketing. In this model, there are two external factors: marketing stimulation and external stimulation.

- Howard-Sheth Model, 1963/1969

Designed in 1969 by John Howard and Jagdish Sheth, it fundamentally enriches the analysis of the formation of attitudes by offering three levels of behavioral responses: cognitive, affective, conative. Thus, the decision process will be different depending on the situation of purchase in which the consumer finds.

- EKB (Engel-Kollat-Blackwell) Model, 1968/1984

This model states that all actions of consumers resulting from internal and external variables. External variables are the social influences (e.g., culture, reference groups and family) and situational influences. Internal variables are individual characteristics (e.g., patterns, values, lifestyle and personality).

- S-O-R (Stimulate-Organism-Response) Model, 1991

The model SOR was developed for consumer purchases in stores. Part of the model is tested with panel data Behavior Scan Information Resources Incorporated. The results show a significant influence on consumer purchases.

- EBM Model, 1995/2001

This model is the basis of EKB model to describe more detailed on consumer buying behavior. It becomes the most model are to analyze consumer buying behavior.

These models could use to explain the relationship between the variables during the purchase processes. Although the processes of purchasing decision are various according to the product, the price and the consumers' abilities. But generally, the process of purchasing decision includes 5 stages (EKB, 1968): Need recognition, Information research, Alternative evaluation, purchase decision and the Post-purchase behavior. And the managers could follow the laws of consumer behavior to make the market strategy: AIDMA, use the advertisement to attract the Attention and Interest, transform them to the Desire and keep the Memory in their brain, then make the Action of purchase.

2.3.2. Consumers' behaviour in E-commerce

In E-commerce environment, consumers' behavior becomes more personality. As e-commerce beyond the limited of time and location, the choices of products were greatly expanded. Consumers of E-commerce generally have a certain cultural level and a certain income level, so they can choose the merchandise with their personal character. Thus, the consumers enjoy more and more their experience of purchasing online. Without the limited of time and location, they can search, compare, share and purchase the products freely.

But they also have the problems facing the massive information from internet, they don't know what course to take because the information from internet is asymmetrical, so consumers cannot analyze effectively the selected products, many consumers purchase the goods by feeling and this increase the possibility of a non-rational choice.

In the E-commerce environment, consumer could get the information through the search engine, online community, social platforms and other ways to share information and experiences. Consumers' behavior has a lot of changes compared to the traditional environment, consumer behavior generally followed AISAS mode.

Consumers are attracted by a good idea or because of a need, they pay Attention to certain products or services, interactive make consumers became Interested in participating, then the consumers go back to the internet to Search for relevant information or information provided by users. They will take the Action after obtaining sufficient information, and sent the experience back to the internet to Share with friends. This makes a complete consumers' behavior in the E-commerce environment.

2.3.3. Consumers' behavior in M-commerce

Consumers' comportments and purchasing decisions are now revolutionary changed thanks to the penetration of smartphone. Consumers no longer need to go shopping since they are doing it at all time and all places. They can find and reserve the products or services at many scenes even when they are busy, they can give orders by phone through the purchase process. This revolution has given consumers the right to speak and brings the challenges for retailers to find the new model to meet new customers' behavior.

The mobile consumer is very different than traditional customer or e-commerce. Consumers no longer need to stay in the shop to make the choice or to seek in front of the computer, they can make the decision by walking, by taking the bus or while watching TV. And then, with the LBS system, consumers can see the rental shops, distance and find the products they need by clicking their mobile phone. In addition, the mobile business is highly customized to different customers; it can offer product or specific services for each consumer.

Due to internet access costs continue to reduce, the popularity of smart phone, smart phones users change their life habits, drive mobile commerce development rapidly. Consumers' behavior in M-commerce is mainly characterized by the following features:

- Anytime, anywhere. Compared to traditional E-commerce, M-commerce environment is more casual and relaxing. Consumers could purchase the products or services at anytime and anywhere constantly. As long as the mobile is in the hands, consumers could browse, compare, order via mobile phone.
- More personalized. Since mobile phones are more personal than fixed computers, each mobile device demonstrates the owner's personality. With the bar codes, two dimensional codes, graphics and voice search and other human-computer interaction technologies, M-commerce allows consumers who have the intent explicit to find the target products quicker and more accurately. If the E-commerce looks like a huge sea, then the M-commerce is the navigator for the consumers.
- More integrity. As the sim card of mobile phone number with user information can determine a user's identity, there is a credit certification basis, so the mobile phone users will pay more attention to their reputation, potentially encourage them become more honest.
- Fragmented. As the mobile phone can be carried easily, consumers use it on the way to work, at the bus station or the metro, in bed, even at the toilet. They could use these fragmented times to make the quick research, compare, fast purchase, social recommendation, reservation and other activities.
- Interactive. Since the transmission of information between mobile devices is one to one, so the M-commerce consumers' behavior shows more interactive features.
- More sensitive with the price. Because the M-commerce is more act at the fragmented times which is limited by the speed and price of internet, so consumers in this case are difficult to make decisions on expensive items, which determine the price is very sensitive for them.

M-commerce environment has the same factors that influence consumers' behaviors in the traditional commerce environment, including the internal factors like motivation, feelings, attitudes, etc. It also contains the extrinsic factors such as social class, family status. Consumers' behavior factors of E-commerce environment are also similar, such as personal characteristics, trading environment, online merchants conduct and Website, etc. But in M-commerce environment, as consumer access to the internet at anytime and anywhere, the factors that influence consum-

ers' behavior are more complex and more diverse. There are some researchers made their contribution in the past decade and we will make a list of them:

Thong, Hong & Tam (2006) discussed the effect of the perceived usefulness, perceived ease of use, perceived entertainment, users' experience difference, customer satisfaction which could influence the use continued with a sample of mobile Internet users. An empirical study confirm the perceived usefulness, perceived ease of use, perceived entertainment have a direct impact to the use continued, customer satisfaction plays the intermediary role has an indirect effects the use continued. The experience difference influence the use continued through the perceived usefulness, perceived ease of use, perceived entertaining and user satisfaction.

Cheong & Park (2005) made a model on the basic of technology acceptance model theory which indicates that the perceived usefulness, perceived entertainment, perceived price level are the important factors of M-commerce. Wu & Yang (2005), Bouwman, Carlsson, Molina-Castillo et al. (2007) have the similar results.

Authors	Factors
Wang & al. (2003)	Cognitive credibility
Vreehopoulos, Constantiou, Sideris et al. (2003)	Security, terminal equipment, custom support, low price
Knutsen (2004)	Efforts expectations, perceived usefulness, attitude
Anderson (2004)	Efforts expectations, desired effect, convenience, social impact
Cheong & Park (2005)	perceived usefulness, perceived entertainment, perceived price level
Wu & Yang (2005)	Users perceived risk, cost, compatibility, perceived usefulness
Jen-Her Wu (2005)	Users perceived risk, cost, compatibility, perceived usefulness, perceived ease of use, use intention, the actual use
Thong, Hong & Tam (2006)	perceived usefulness, perceived ease of use, perceived entertainment, users' experience difference, customer satisfaction
Bouwman, Carlsson, Molina-Castillo et al. (2007)	The factors varied by different M-commerce users
Mahatanankoon (2007)	Individual creativity, perceived entertainment, excitement exited level

3. Research Methodology

In this section, the paper attempts to discover the mobile services offered by the retailers and to examine the change of the consumers' behavior. The purpose is to find out the context of using the mobile phone to purchase and reserve the products and/or the services. The objective of paper is to draw a conceptual framework of the interactions between the consumers and the service providers. The interviews were focused on the retailing context, as a research context, it offered a global and dynamic business environment to address the emerging research phenomenon and provided the access required to generate the interesting and diverse illustrations of m-services from which a tentative framework could be suggested (Saarijärvi, Mitronen & Yrjölä, 2014).

3.1. Respondents

To achieve the objective of this paper a set of personal semi-structured interviews with 15 people were conducted in France with European, Asian users. The respondents were selected by different backgrounds such as age, sex, work, family role, etc. And the interviews were carried on in varying situations i.e. in front of the supermarket, fast food store, train or bus station, university, office, and at home to distinct the different context of using mobile phone. Participants were ranging from 20 to 56 years old and were business professions, students, academicians. Irrespective of the interviewee's gender, majority of the participants had a good knowledge of the mobile commerce and consumed frequently via their mobile phones.

3.2. Interview procedures and analysis

The interviews process was devised to two stages. First, we asked the interviewee when and where they use the apps and what kind of function was most useful for them, so we can determine the context of using mobile applications which designed by the retailers. To capture the entire use context, they were asked to describe

- One situation where they use the mobile apps of retailers
- The reason they use it and what experience they got from that situation
- Which m-service they feel the most useful

Second, we asked them the level of interaction in each stage of their purchase, the objective was to find out the factors of interaction in each stage of mobile commerce environment. In this part, the interviewees were asked to describe

- The stage of their purchasing and
- What interaction they made
- How they feel about these interactions for their shopping experience.

4. Result and discussions

The analysis was made to construct a tentative framework to understand how the retailers change the consumers' behavior by offering the m-services. The framework is comprised by two dimensions: first, the context describes the factors influenced the customer perceptions of using m-services, including time, location, internet condition. Second, the interaction describes the interactions established by the retailers through the m-service at each stage of purchasing, including pre-purchase stage, transport stage, in store stage, comparing stage, purchase stage and post-purchase stage. These two aspects all have discussed through the interviews and found positive for the consumers' behavior.

4.1. Context of using m-services

Through the interviews with participants, the role of context appears to be a critical part of their purchasing experience. They described the time, the location and the internet condition are very important for them to use the m-service instead of other channels.

4.1.1. Time

For the first factor 'time', it was considered as the key to open the door of m-service, because it allowed consumers to benefit better their fragmented time.

Informant 7, Male, Asian. "I'm so glad to use my smartphone when I have a little time between the work and other activities. For example, I could watch the products and promotion information when I go to the toilet or when I take a little rest between my work times. This really is useful for me to notice and capture the new products because I don't have enough time to go to store every day. I used to be bored when I go to the toilet, but now I feel I could stay there for the whole afternoon."

Informant 12, Female, European. "I just finished my study life of university and I have a part time job in a restaurant, so I have a lot of time now. As I don't have a vehicle to go shopping, so I spend a lot of time on mobile apps. I can spend whole day to compare the price and put it in my purchase list, it's kind of fun."

Informant 5, Male, Asian. "I just like to reserve my tickets or hotels via my iPhone, it's very easy to use and I can do it anytime I want. So, I feel a lot of liberation with it. I even order my pizza with me phone, I don't want to go to the store with too many other customers in the waiting line."

So, we could see there are three kinds of time factors like fragmented time, abundant time and intended time. They all have different rhythm of life, but they all choose to spend their time with m-service to make it more useful.

4.1.2. Location

The second factor of use context was 'location', as we mentioned before, consumers could use the m-service at anytime and anywhere. It makes these two factors inseparable, for example, consumers could use the LBS to get the quick information when they are in an unfamiliar location.

Informant 9, Male, European. "It was my first time in China for a business conference, I was in the airport and I have to go to the meeting room in three hours. But I lost my laser pen which is very important for my presentation, so I used my phone to find a store not too far from the building where I should go, that is really helpful."

Informant 3, Female, American. "I take the shuttle to go to work every time I have to fly. When I wait the shuttle at the station and wait my plane at the airport, I prefer to search the local information where I will fly to. "

As a result, we considered the location has two aspects: location conversant and location unversant.

4.1.3. Internet condition

The access of internet of mobile and fixed device is very different. The mobile internet access is slower, the signal is weak at some location, the security problems and the cost of internet is expensive. This factor truly influenced the consumers' purchasing decision.

Informant 7, male, Asian. "Well, it's different to connect to internet at the train from the toilet. I usually take a book when I take the train or a plain because I can't get the Wi-Fi, if I have it everywhere, I will never finish one book in my life."

4.2. Interaction at each stage of purchasing

As we mentioned before, in traditional commerce we follow the follow the laws of consumer behavior to make the market strategy: AIDMA, use the advertisement to attract the Attention and Interest, transform them to the Desire and keep the Memory in their brain, then make the Action of purchase. And when the E-commerce showed up, we changed it to AISAS mode. Consumers are attracted by a good idea or because of a need, they pay Attention to certain products or services, interactive make consumers became Interested in participating, then the consumers go back to the internet to Search for relevant information or information provided by users. They will take the Action after obtaining sufficient information, and sent the experience back to the internet to Share with friends. But in the M-commerce environment, as consumer access to the internet at anytime and anywhere, the factors that influence consumers' behavior are more complex and more diverse which make the purchasing procedure become a 6 steps cycle. Including the pre-purchase stage, the transport stage, the in store stage, the comparing stage, the purchase stage and the post-purchase stage. And we observed the factors of interaction between consumers and retailers at each stage of purchasing.

4.2.1. Pre-purchase stage

Consumers search and analyze the information they found or promoted from the retailers. Before they go to the store, they usually search the product index and price at their spare time. Retailers must pay very attention at this stage to keep them loyalty by analyze consumers' habit.

Informant 11, Male, Asian. "The promotion they sent me is very interesting because they seem to know what I'm looking for. For example, I need to buy a print machine two weeks ago which I searched it a lot for the best price. And then the Carrefour

sent me a list of printer with promotion, I was so happy and surprised that I found it this way.”

Informant 8, Female, European. “Every time I went to a forum, I see people recommend the baby diaper from Auchan. So I use my iPhone to download the Auchan apps and they even have a forum named ‘Auchan Baby’, I found a lot of articles interesting and I still have some questions in my mind, so I went to the store to ask the sellers there, they were really nice with me. I was so touched and I decided to purchase all I need for my baby in Auchan.”

So, in this stage we can find that promoting, social media and reputation are three factors important for the m-service.

4.2.2. Transport stage

This stage occurs when consumers go to shopping in store or go to somewhere else. With the technology of LBS, retailers could send the accurate information or highly related information to their customers. Or they can also send the store location to them for the convenience.

Informant 15, Male, European. “...We were in this small town and we don’t know where we could find the store, so Nicolas used his phone to find a Casino which is 10 minutes from us. We were so happy because otherwise we will have nothing to eat for that night.”

Informant 6, Female, Asian. “I think because I wrote barbecue meat in my shopping list, when I was driving to the Carrefour, they sent me the message that they are having the promotion for the barbecue sauce. I mean this is interesting because I just forgot to write the sauce in my list.”

Consequently, we can put the promotion accurate and store location system in the list of factors.

4.2.3. In-store stage

In this stage, consumers are physically in the store and they will purchase normally. But retailers still need to offer the m-service to make them more satisfied. The in-store function of Walmart is very interesting as an m-service, it switches automatically when consumers enter into the store, and they could locate the consumer’s position and told them where to go for the right product.

Informant 10, Female, Asian. “It’s useful to use the store model because I could find what I want quickly. And I can use my phone to scan the product for more information when I find it. Like a bottle of wine, I can’t find the price and I scan it with my phone, the price came up.”

Informant 2, Male, European. “They have Wi-Fi in Carrefour and the speed is not bad, so I really enjoy the shopping with my wife there.”

4.2.4. Comparing stage

When consumers touched the products they might buy, this stage will come out. Retailers could interact with them by offering more information.

Informant 14, Female, Asian. "I need to prepare a dinner for my friends and I had no idea in my mind, so I went to Carrefour with no list at all. I planned to buy the first thing I saw in the food region. But, when I picked up one box of chicken and scan it, there is a recipe of curry chicken came out. And they even marked the position of every ingredients I need, so I made my shopping quickly and went back home to prepare the dinner."

So, the personal assistant in store will help consumers to make their decision easier, and they could interact with the retailers for more information.

4.2.5. Purchase stage

Informant 1, Male, European. "Payment is easier than before, I don't have to bring my wallet every time I go to shopping. I could pay with my smartphone. But I worried about the security problem at the same time, if they steal my phone, I can do nothing then."

Informant 14, Male, European. "It's very useful to keep the member card in my phone. I hate when I have to take three or four member card with me, they take a lot of place. Now I can just scan it in my phone."

We can find that mobile payment and member card management are also two factors important for the interaction aspect.

4.2.6. Post-purchase

At this stage, consumers could share their shopping experience with friends, families or colleagues by photos, videos and discussions.

Informant 13, Female, Asian. "I'd like to take the pictures of what I bought and share it with my friends. I can put it on Facebook, twitter and Instagram."

Informant 10, Female, Asian. "Every time I see my friends share some nice food, I want to go buy it immediately. Maybe I'm so greedy."

5. Conceptual Model and conclusion

Following the discussions we mentioned above, we can see the use contexts and the interactions of each stage of purchase are two aspects influence the consumers' behavior. In each aspect we defined the factors of m-service. And, we propose the conceptual model of consumers' behavior in m-commerce of retail industry. See at Figure 1 below.

5.1. Theoretical implications

This paper is one of the first studies to focus on the influence of use context and interaction on consumers' behavior. It discovers the three key elements of use context of retail industry, and the factors of these elements were discussed to help us understand the important role of use context. In addition, the interaction of each stage of purchase in m-commerce was discussed to understand the importance of con-

sumers' participation. Especially in retail industry, consumers have more and more interaction with the retailers and their behaviors are changing. The factors we proposed in this paper are rarely mentioned in the previous studies.

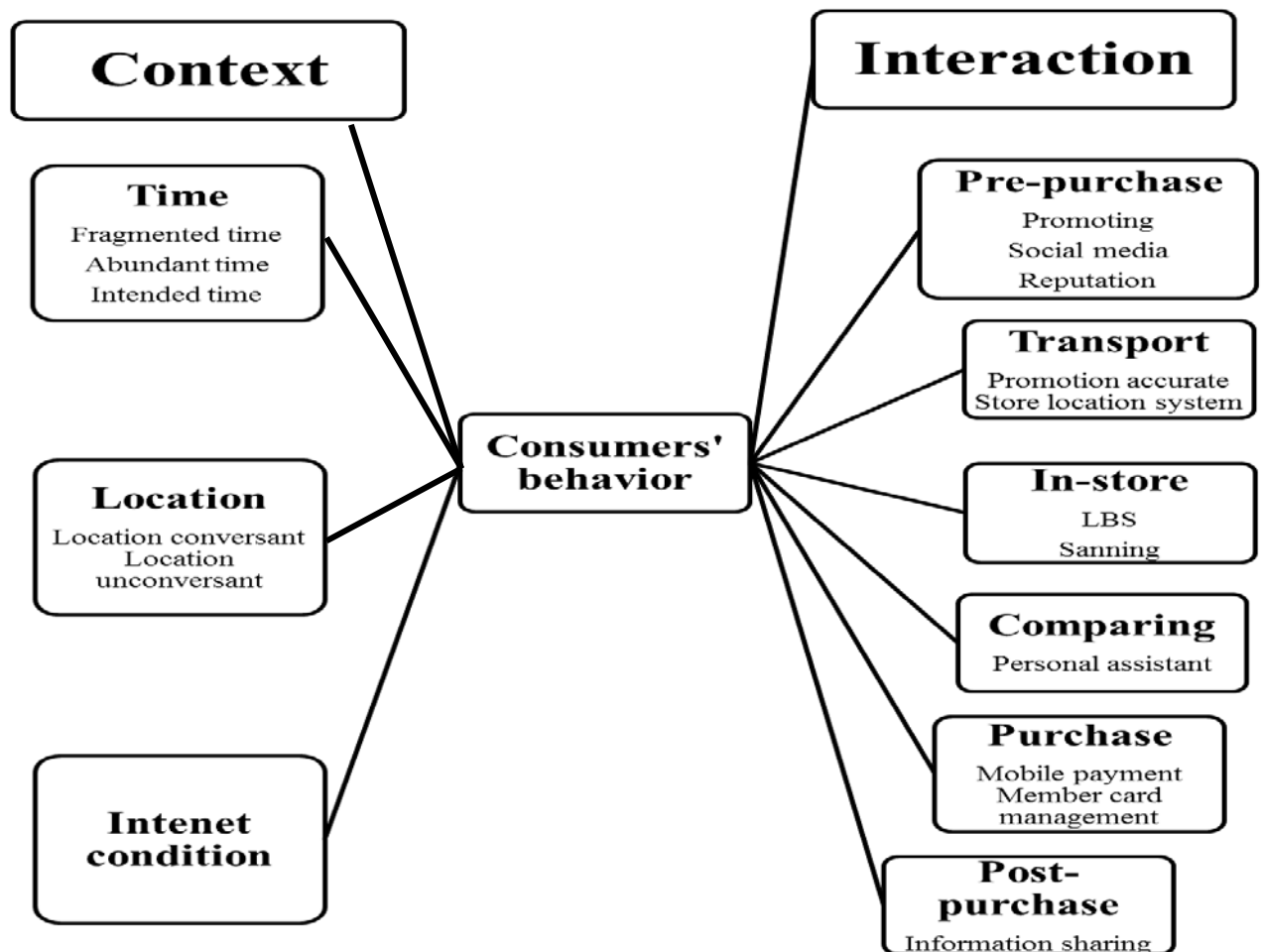
5.2. Managerial implications

Retail industry is facing the increasing competition from E-commerce, retailers are looking to M-service as an innovative way to adapt the changing behavior of their customers and make them satisfied. This study proposed the new factors which could influence the consumers' behavior, managers could use them to design the m-service easier to use.

5.3. Limitations and future research

The research on the context and interaction are really rare in the past, so we can't find enough back theory to support our model. Most of papers focus on the acceptance of m-commerce, but not the factors influence the consumers' behavior. Especially, this study focuses on the retail industry which is also new for the concept. The number of participants for the interview is also low.

Figure 1. The conceptual model of consumers' behavior in m-commerce of retail industry



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J: Service management and marketing theory and research methods in an innovative perspective

J1: Co-creation

Chair: Donna Sundbo

Co-Creation of Value and Coproduction: A systematic review of the literature from the last 32 years

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This paper reviews the literature of coproduction and co-creation of value published over the last 32 years (1983-2015) through the examination of 451 selected research articles. By using a content analysis, it provides a set of seven thematic categories, which are tested on a Multiple Correspondence Analysis – MCA, in order to investigate the relationships between the subfields of coproduction and co-creation of value. We highlight other descriptive analyses such as top publishing authors and most cited papers. A discussion of possible pathways for future studies is also provided.

1. Introduction

The objective of this paper is to systematically review and summarize the scientific production about co-creation of value and coproduction over the last 32 years (1983-2015). Through the analyses performed on this paper, we seek to map the evolution of this field of study, describing its main characteristics and themes researched within it. The present work aims at not only assessing and contributing to the understanding of the structure and trajectory of the content of this literature, but also point out conjectures about future developments on the field and tendencies for upcoming researches.

One of the first papers to discuss the concept of coproduction is the work of Brudney and England (1983), which focus on defining this construct in the lenses of the public services. Since then, many other authors gave contributions to this research field, defining and testing the coproduction construct in many sectors and types of organizations, deepening the understanding of its most efficient practices and the results it may bring to organizations and customers alike. In this time, the concept of co-creation of value, as discussed, for example, in the papers by Prahalad and Ramaswamy (2004) and Vargo and Lusch (2004), began its diffusion through many publications, sometimes proposed as a synonym for coproduction, sometimes as a different construct altogether. Either way, both these concepts represent a great area of interest to marketing, services, and many other areas, and an analysis of their literature structure may help provide future researchers with a direction to further the knowledge on this field.

After 32 years of publications, we ask where this research field of coproduction and co-creation of value stands. To answer this question, we propose the analysis of the structure of the field, describing the main journals, countries and authors who published in the last three decades, while also observing the distribution of publications

through time and the impact of the papers. Complementary, we attempt to organize all selected articles into thematic categories, and analyse the relations between these categories, in order to identify the main streams of research in coproduction and co-creation of value.

To perform the proposed analyses, this paper is structured as follows. After this introductory section, we present a brief overview of the development of coproduction and co-creation of value, followed by a description of the methods employed in this study. We present, in the methods section, a detailed description of the coding procedures, showing the paths taken to create the seven thematic categories for the frequent researched streams on coproduction and co-creation of value. The analysis of the literature, presented after, allow an evaluation of the structure and suggests trends for the research field. Finally, in the last session, we present suggestions for a research agenda from the gaps observed through the analysis.

2. Coproduction and co-creation of value: an overview of the research field

In order to understand and discuss the future of research in coproduction and co-creation of value, it is important to, initially, understand the origins and evolutions in the development of this field. In the beginning, the studies of coproduction focused mainly on the public sector and on citizen participation on the service delivery. Due to the increasing pressure for the government to provide more and better public services, the first studies saw coproduction as a way to raise the quality and efficiency of public services, by looking at the citizens as agents of change and not merely as consumers (Brudney; England, 1983; Schneider, 1987; Neiman, 1989). The realization that some public services can only be delivered in coproduction with citizens also contributed to the development of this field of study (Powers; Thompson, 1994). Brudney and England (1983, 63) defined coproduction as “the degree of overlap between regular producers and consumers”, that is, the degree of overlap determines the type and results of the coproduction. The coproduction concept also proved valuable to increase technology and knowledge transfer between countries and increase the possibilities of growth for developing countries (Quintana, 1984). It was only in the 2000s that coproduction research started to focus more on the private sector.

The growing pressure on firms and marketing diversification promoted a shift from segmented marketing towards a more customer-centric marketing (Sheth *et al.*, 2000; Prahalad; Ramaswamy, 2004). The co-creation concept gained strength as a result of this new marketing approach, which focus on intangible resources, relationships and increasing the value perceived by the customers (Prahalad; Ramaswamy, 2004; Vargo; Lusch, 2004). The integration of resources and complementary competences and the interaction between producers and consumers add value to a service, so both parties benefit from the relationship by co-creating value (Prahalad; Ramaswamy, 2004; Vargo *et al.*, 2008). Co-creation brings the focus mainly to an interaction between consumer and company as the locus of value creation, and this new approach implies that all the points of this interaction are critical to the creation of value (Prahalad; Ramaswamy, 2004). The concept of value co-creation shifts the focus from the output delivered and the value in-exchange toward value-in use, having knowledge as crucial resource (Vargo; Lusch, 2006; Vargo *et al.*, 2008).

Although sometimes the difference between these two concepts seems blurry, some authors assume that coproduction happens within the production process and that co-creation of value happens during the consumption phase (Lusch; Vargo, 2006; Etgar, 2008; Bacile; Goldsmith, 2011). Vargo (2008) and Ertimur and Venkatesh (2010) view coproduction as the activities executed jointly by the firm and the customer to create an output while co-creation of value focus specifically on the value creation to the customer, thus being aligned with value-in-use. To Vargo (2008), the two concepts are not opposites, but hypernymic, that is, coproduction is a part of the co-creation of value. Unlike the engagement of the customer in coproduction of the service, which is optional, the co-creation of value is not (Vargo; Lusch, 2008), and it cannot occur without customer participation (Vargo, 2008). Even with these attempts to differentiate co-creation and coproduction, some authors, such as Needham (2008), Payne *et al.* (2008), Alexander *et al.* (2009) and Lang *et al.* (2009), choose not to distinguish between the two concepts, considering both of them important to increase the quality and quantity of the services provided. Since co-creation, as well as coproduction provide better results for the organizations and the customers and complement each other, this paper does not distinguish between the two approaches and considers both concepts as one field of study.

Over the last couple of years, studies have explored broader aspects of coproduction and co-creation of value, for example co-creation involving the government, private industries and the citizens to increase sustainability (Trencher *et al.*, 2014) and co-creation of value with stakeholders in order to gain competitive advantage (Goulliart, 2014). Jaakkola and Alexander (2014) investigated the role of customer engagement behavior in value co-creation and the influence it might have on the firm through a case study in a public organization. Recent papers also focused on ecosystems of service exchange (Vargo *et al.*, 2015), the different characteristics that drives a citizen to engage in collective or individual coproduction and how the government can increase the collective coproduction (Bovaird *et al.* 2015) and also recognized that innovations is always a co-creational process (Akaka; Vargo, 2013; Vargo *et al.*, 2015).

3. Method

Considering the main goal of this paper – to systematically review and summarize the scientific production about co-creation of value and coproduction over the last 32 years – the first step was assembling a database of articles published on these themes. In order to build such database, we consulted the following multiple research directories: Annual Reviews, Oxford Journals, Cambridge Journals Online, SpringerLink, JSTOR Arts & Sciences III Collection, Academic Search Premier, Directory of Open Access Journals, Sage, ScienceDirect and Emerald Insight. The search option of directories over journals was taken to prevent a journal from being privileged over another in selection procedures, seen that all journals gathered in directories had the same chance of appearing in the research. In addition, since the present paper intends to show the level of diffusion of individual papers according to their citations, we chose not to adopt journals' impact factor as a selection criteria. With the directories list, the next step was the definition of keywords to be used during the search phase. Two terms, and their variations, were chosen: “coproduction” or “co-production”, and “co-creation” or “cocreation”. The search mechanisms were programmed, whenever possible, to search only in titles, abstracts and keywords. In this way, we

limited our results only to articles that had coproduction or co-creation of value as one of their main subjects. A subsequent selection was performed adopting the following discard criteria: a) every paper duplicity was eliminated; b) papers that only mentioned the words coproduction or co-creation were discarded, in order to keep only articles that discussed, tested or mapped these subjects. It is important to notice that we chose not to use year of publication as a search or discard criteria, but in press papers at the moment of the search procedure, which was executed on March 2015, were not considered. With the application of these search and discard criteria, we were able to build a database consisted of 451 papers published between 1983 and 2015.

The following information were extracted from each selected article: journal of publication, year of publication, title, authors, authors' countries, keywords and number of received citations. Statistical analyses were then carried out on these data to achieve the desired results of the present paper. Thus, nine main outputs will be presented in the following sections: categories of keywords after coding, number of articles per category, top publishing journals, top publishing authors, top publishing countries, top cited articles, number of articles published per year, number of published papers per category per year and a Multiple Correspondence Analysis of the categories.

3.1. Coding

The coding procedures performed, aligned with the coding method described by Furrer *et al.* (2008), had the objective of building categories representing the main themes discussed in the selected articles. These procedures took into account the original keywords assigned by the authors to their papers. A few of the selected articles had no original keywords assigned and, in those cases, the author of the present paper assigned, individually, keywords base on the title and abstracts of the articles. These new keywords were then triangulated among the authors in order to arrive at a final list of keywords for all articles selected. This set of keywords was converted into one major list composed of 1383 keywords. Three elimination criteria were employed on this list. First, all keywords with only one appearance on the list (1123 of 1383, 81,2%) were eliminated, seen that they were not representative of main themes of research and unhelpful to the creation of categories. Second, we eliminated terms representing pleonasms of the research topic itself, such as “co-creation”, the keyword with highest frequency at 81 appearances, and “value co-creation”, with 78 appearances. Additional terms such as “service” were discarded for the same reason. Third, terms representing countries or research methods were also eliminated, since our purpose was not to identify methodological approaches, but major themes researched on the subjects. Some of the terms discarded in this third criterion were “case study”, “action research” and “methodology”. After all eliminations, the final list of keywords used for categorization was composed of 166 terms.

These 166 unique terms were grouped by iteratively sorting the individual keywords and reorganizing them into coherent categories through content analysis and coding (Bardin, 2006; Flick, 2009). After several rounds of discussion, seven thematic categories were generated, and each unique keyword was assigned to only one category. When it the categorization of a unique keyword was unclear, either because it

could fit on more than one category at the same time or because the authors classified that keyword on different, the papers listing that keyword were analysed with more depth in order to determine the correct category to which assign that keyword. Table 1 shows every original keyword placed in the seven categories created.

Category	Original Keywords
Innovation	innovation; service innovation; creativity; user innovation; new product development; collaborative innovation; idea generation; innovations; open innovation; product innovation
Public Sector	public services; citizen participation; e-government; local government; citizen coproduction; citizenship; citizenship behavior; customer citizenship behavior; public officials; public policy; public sector; public sector organisations; public sector organizations; state-society relations; community; third sector
Marketing	marketing; relationship marketing; marketing strategy; services marketing; industrial marketing; social marketing; branding; brands; service marketing; brand management; brand value; brand; brand community; consumer marketing; corporate branding; experiential marketing; marketing theory; identity; market orientation; markets
Customers	customers; consumer behaviour; customer participation; customer value; customer service management; customer services quality; customer engagement; customer involvement; customer satisfaction; customer co-creation; customer experience; customer integration; customer relationship management; experience; loyalty; customer loyalty; customer orientation; customer relations; consumers; customer; consumer; consumer co-creation; consumer engagement; consumer experience; customer centricity; consumer resistance; consumer work; customer co-production; customer cocreation; customer information; customer roles; customer value co-creation; prosumer; presumption; user involvement; empowerment; satisfaction; well-being; older people; exploitation; football fans; free labor; self-efficacy; attitudes; choice; double exploitation
Value	value; value creation; value-in-use; value analysis; value networks; value proposition; value chain; value propositions; value co-destruction; value-in-context; value-in-exchange; values
ICTs	social media; technology; web 2.0; online communities; communication technologies; information technology; online community; new media; big data; internet; social networks; simulation
Business & Strategy	strategy; competitive advantage; governance; knowledge management; supply chain management; corporate strategy; business development; business model; business service; capabilities; decision making; decision support systems; distribution management; knowledge; knowledge transfer; leadership development; organizational learning; organizational socialization; performance; sustainability; learning; networking; partnership; crowdsourcing; stakeholders; communication; learning organizations; network; networks; organizational performance; outsourcing; absorptive capacity;

	crowd-funding; entrepreneurialism; environment; ethical economy; institutional arrangements; institutions; resource efficiency; social capital; stakeholder; stakeholder analysis; working practices; intermediaries; learning methods; participatory cultures; suppliers; structuration theory; systems theory; buyer-supplier relationships
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Table 1. Thematic categories and their original keywords

As pointed out by Furrer *et al.* (2008), previous studies of articles' production have generally classified papers in only one primary category (Helgeson *et al.*, 1984; Yale; Gilly, 1988; Bingham; Bowen, 1994), but, according to Inkpen and Beamish (1994), using a single category fails to acknowledge the cross-functional and interdisciplinary nature of an academic field, in their case, strategic management. Considering that co-creation of value and coproduction are, such as strategic management, cross-functional fields, no limits were set on the number of categories per article, being possible to one paper to fit into one unique category, or be allocated across two or more categories of keywords. This explains why the total percent on the third column in Table 2 is higher than 100%. Among the 451 articles, 129 (28.6%) were allocated into only one category, 171 (37.9%) into two, 107 (23.7%) into three, 28 (6.2%) into four, 13 (2.9%) into five, and 3 (0.7%) into six categories. The overall mean was 2.2 categories per article. Table 2 presents the number of articles per category.

Category	No. of articles	%	Adjusted %
Business & Strategy	252	55.9	25.5
Customers	228	50.6	23.1
Value	180	39.9	18.2
Marketing	97	21.5	9.8
Innovation	90	20.0	9.1
Public Sector	70	15.5	7.1
ICTs	70	15.5	7.1
Total	987	218.8	100.0

Table 2. Number of articles per category

4. Analysis

By analysing the frequency distribution of papers among publishing journals on the selected databases, we found that 172 different journals published articles on the themes searched. Of this total, 105 were journals with only one paper published in the period, representing 23,3% of all selected papers; 45 journals had two, three or four publications, summing 25,3% of the total production; 15 journals had between five and eleven paper published, which represents 23,7% of the articles selected; and 7 journals had 12 or more publications on the period, adding up to 27,7% of all papers published on the period. This data underscore that roughly half of the total production of papers on the period researches was concentrated on 22 out of 172

journals. Many of these top publishing journals are focused on the publication of papers in the service or marketing fields, which can be viewed, due to this concentration of publications, as possibly the two main areas of knowledge with an interest on studies about coproduction and co-creation of value. The list of top publishing journals is presented on Table 3.

Journal	Freq.	%	Cumulative %
Journal of Service Management	27	6.0	6.0
Industrial Marketing Management	22	4.9	10.9
Journal of the Academy of Marketing Science	18	4.0	14.9
Journal of Service Research	17	3.8	18.6
Marketing Theory	17	3.8	22.4
European Journal of Marketing	12	2.7	25.1
International Journal of Quality and Service Sciences	12	2.7	27.7
Journal of Business Research	11	2.4	30.2
Strategy & Leadership	10	2.2	32.4
Australasian Marketing Journal	9	2.0	34.4
European Management Journal	8	1.8	36.1
International Journal of Physical Distribution & Logistics Management	8	1.8	37.9
Managing Service Quality	8	1.8	39.7
Journal of Services Marketing	7	1.6	41.2
Voluntas	7	1.6	42.8
European Business Review	6	1.3	44.1
Journal of Interactive Marketing	6	1.3	45.5
Journal of Macromarketing	6	1.3	46.8
Tourism Management	6	1.3	48.1
Business Horizons	5	1.1	49.2
Journal of Business & Industrial Marketing	5	1.1	50.3
Marketing Intelligence & Planning	5	1.1	51.4

Table 3. Top publishing journals

We also investigated the frequency in which each author published and calculated the absolute and adjusted frequencies of their appearances on the database. The number of adjusted appearances reflects multiple authored articles, that is, if a paper has two authors, each one received half a point. In the case of three authors, each one received a third of a point and so on. The 451 articles on the database were published by 915 different authors. Of this total, 795 were listed in only one paper, and 89 were listed on two. This means that only 31 authors, representing 3.4% of all authors, had three or more appearances on the database. This data indicates that only small percentage of authors are consistently publishing studies on coproduction and co-creation and, as pointed out by other review authors, these key individuals are one of the most important factors to a field's structure and growth, and through their work it is possible to better understand the past evolution of a field and its likely future directions. 20.18% of the articles were single authored, 35.92% had 2 authors, 28.6% had 3 authors, 10.64% had 4 authors, 2.66% had 5 authors, 1.33% had 6 au-

thors, 0.22% had 7 authors, and 0.44% had 8 authors. The top five publishing authors in terms of adjusted appearances were: Bo Edvardsson, Stephen L. Vargo, Venkat Ramaswamy, Robert F. Lusch and Christian Grönroos. Table 4 provides a list of the 18 most published authors ranked by adjusted appearances.

Author	Total Appearances	Adjusted Appearances
Bo Edvardsson	15	11.25
Stephen L. Vargo	13	9.17
Venkat Ramaswamy	7	6.0
Robert F. Lusch	7	5.5
Christian Grönroos	4	4.0
Bernard Cova	4	3.5
Per Kristensson	5	3.0
Kaj Storbacka	5	3.0
Elina Jaakkola	4	3.0
Paul P. Maglio	4	3.0
Robert C. Ford	3	3.0
Tronvoll, Bard	7	2.92
Adrian F. Payne	4	2.7
Pennie Frow	4	2.67
Jennifer D. Chandler	3	2.5
Taru Hakanen	3	2.5
Andrea Ordanini	3	2.5
Thorsten Roser	3	2.5

Table 4. Top publishing authors

Although there is some difference in the ranking when considering the appearances of authors before and after adjustment, we found that they are highly correlated. For the top 18 authors listed on Table 4, the Spearman correlation between total and adjusted appearances is 0.783, and the Pearson correlation equals 0.955. When considering all 915 authors, Spearman correlation equals 0.435 and Pearson correlation equals 0.862. These coefficients indicate a strong linear relationship between total and adjusted appearances.

Beyond the top publishing authors, it is important to identify what are the most influential articles published in the period, seeing that publications with seminal roles are accelerating factors to the development of a field (Berry; Parasuraman, 1993). Although the generally accepted method to define and measure the influence or impact of an article is the summed citation counts (Tahai; Meyer, 1999; Ramos-Rodriguez; Ruiz-Navarro, 2004; Bergh *et al.*, 2006), we decided to rank the articles by the number of citations divided by the number of years since the publication. This decision was made because a paper published in early years has a bigger chance to have more citations than a paper published in a later period and, in using an adjusted index, the number of citations is better balanced.

Article	Total Citations	Citations per Year
Vargo and Lusch (2004)	6573	597.5
Payne <i>et al.</i> (2008)	1122	160.3

Vargo <i>et al.</i> (2008)	1017	145.3
Prahalad and Ramaswamy (2004)	1578	143.5
Ostrom <i>et al.</i> (2010)	531	106.2
Gröonroos and Voima (2013)	196	98
Brodie <i>et al.</i> (2013)	191	95.5
Lusch and Vargo (2006)	830	92.2
Vargo and Lusch (2011)	343	85.8
Maglio and Spohrer (2008)	593	84.7

Table 5. Top cited articles

Furthermore, this study considered the countries of the institutions each author was associated when their article was published. As with the appearances of authors, both the total and adjusted frequencies of countries' appearances were calculated. The 915 authors published from 43 different countries. The top 5 countries in terms of both total and adjusted appearances were: United States of America, United Kingdom, Sweden, Australia and Finland. Table 6 provides a list of the 18 countries with most published articles.

Country	Total Appearances	Adjusted Appearances
USA	256	169.45
UK	177	112.32
Sweden	97	60.43
Australia	83	52.23
Finland	66	47.17
Italy	45	29.75
New Zealand	35	21.82
Netherlands	27	18.56
France	25	18.5
Taiwan	27	17.92
Germany	31	17.53
Spain	23	14.75
Norway	22	14.67
Canada	20	13.7
China	20	13.62
Japan	19	11.28
Denmark	14	8.0
Ireland	12	8.0

Table 6. Top publishing countries

As it was the case in the top publishing authors, we found that total and adjusted appearances for countries are highly correlated. For the top 18 countries listed on Table 6, the Spearman correlation between total and adjusted appearances is 0.983, and the Pearson correlation equals 0.999. When considering all 43 countries, Spearman correlation equals 0.992 and Pearson correlation equals 0.999, once again indicating a strong linear relationship between total and adjusted appearances.

An analysis performed to help elucidate how this field of study is developing is the distribution of papers published along the years. The 451 articles selected to the

present study were published from 1983 to 2015. The search for the articles did not consider any initial date, and the first article selected was published in 1983. This shows that this field is being studied for over 30 years. Nonetheless, the distribution of articles is not even over time. The early years of this interval recorded a very low incidence of articles. Until 2003, only 5,1% of the selected papers had been published and only 21,7% until 2009. Also, there were no articles selected during 6 of the first 19 years. These data show that, although this research field is over three decades old, it is still developing, with a steady growth in the number of publications since 2010. Table 7 presents the distribution of articles published by year.

Year	Freq.	%	Cumulative %
1983	1	0.2	0.2
1984	1	0.2	0.4
1985	0	0.0	0.4
1986	0	0.0	0.4
1987	1	0.2	0.7
1988	1	0.2	0.9
1989	2	0.4	1.3
1990	0	0.0	1.3
1991	1	0.2	1.6
1992	1	0.2	1.8
1993	1	0.2	2.0
1994	2	0.4	2.4
1995	0	0.0	2.4
1996	3	0.7	3.1
1997	0	0.0	3.1
1998	1	0.2	3.3
1999	0	0.0	3.3
2000	2	0.4	3.8
2001	0	0.0	3.8
2002	4	0.9	4.7
2003	2	0.4	5.1
2004	8	1.8	6.9
2005	6	1.3	8.2
2006	6	1.3	9.5
2007	8	1.8	11.3
2008	26	5.8	17.1
2009	21	4.7	21.7
2010	36	8.0	29.7
2011	52	11.5	41.2
2012	65	14.4	55.7
2013	81	18.0	73.6
2014	91	20.2	93.8
2015 (until march)	28	6.2	100.0

Table 7. Articles published by year

To explore the connections among categories we decided to employ a MCA. A Correspondence Analysis (CA) is a compositional method to a perceptual mapping that is based on variables of a contingency table. The results portray these variables in a common visual representation. A Multiple Correspondence Analysis (MCA) is a form of CA that involves three or more variables related in a common perceptual space (Hair *et al.*, 2009). MCA allows the researcher to explore multi-way tables in order to detect structure in the relationships between variables, showing which rows and columns of a frequency table have similar patterns of counts (Furrer *et al.*, 2008). In this study, the rows and columns of the frequency table are composed by a binary rating, 1 for yes and 0 for no, expressing if each article fits into each of the seven categories or not.

Before proceeding with the MCA, the optimal number of dimensions of the perceptual map have to be selected. To this end, we calculated the eigenvalues, also known as singular values, which are derived for each dimensions and indicate the contribution of each dimension explaining the variance in the categories (Hair *et al.*, 2009). The scores of the eigenvalues calculated were: 0.036, 0.029, 0.022, 0.021, 0.018, 0.014 and 0.009. Since there is no evident break on these values, we chose to perform the MCA with two dimensions for the graphical data representation, as it was done by Furrer *et al.* (2008) and Moreira *et al.* (2014).

The interpretation of the results of an MCA is based on the proximity of the variables on the perceptual map. If two variables have similar patterns of counts in their frequency tables, they will appear next to each other. If the correlation between these variables in the data sample is lower, they will appear further away (Bendixen, 1995). This means that, if two categories are close to each other, that is because a large proportion of articles fit on both of them together, if they are distant from each other, then a small proportional of articles discuss both themes at the same time. Figure 1 presents the general MCA for our data. The categories are represented by the circles, and the size of each circle is proportional to the number of articles associated to that category.

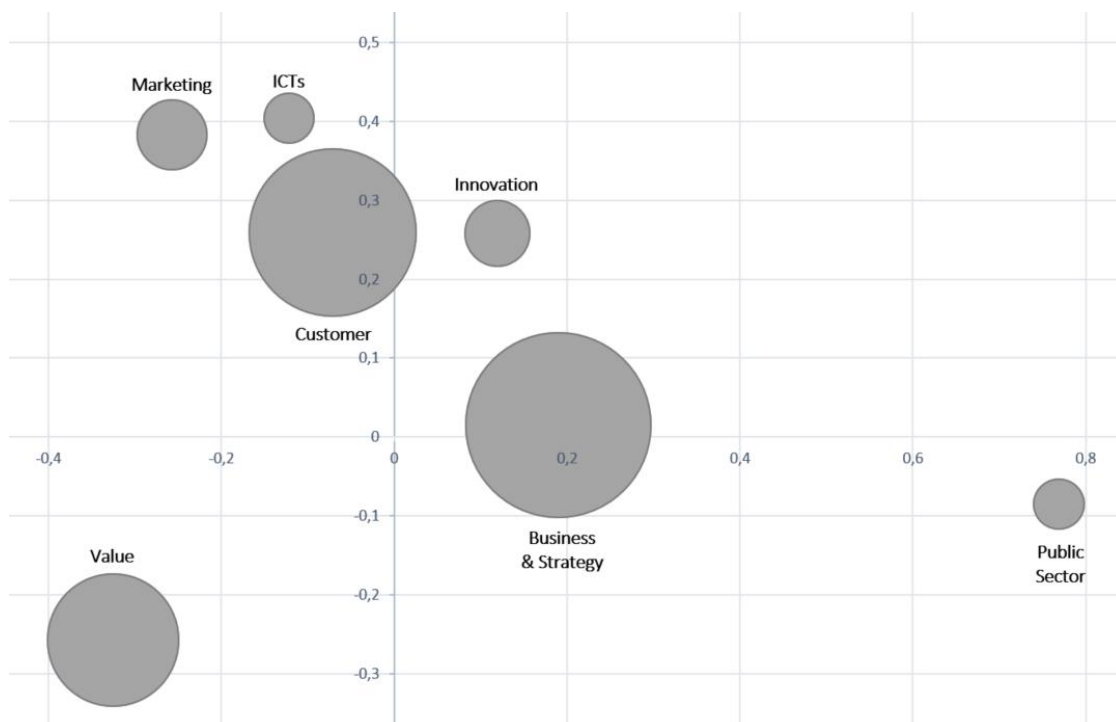


Figure 1. Multiple Correspondence Analysis of the selected articles

A couple main interpretations arise from this MCA. First, there are two isolated categories, Value and Public Sector, meaning that these two themes are often researched on their own. A second is the area with condensed categories. This area, composed by Marketing, ICTs, Customers, Innovation and Business & Strategy, which is slightly further away, suggests that these themes are often researched together. The Customers category seems to be the link between many of these themes, which can be possibly due to the large amount of articles in this category. Business & Strategy, the category with the largest number of articles, on the other hand seems mostly connected to Innovation and Customers studies, but not with Marketing and ICTs which are more closely related to the Customers theme.

Although the distance between categories on the perceptual map may suggest a research gap, a deeper discussion of the value of adding themes together is needed in order to indicate possibilities for future studies. For example, Public Sector and Customers have low correlation, represented by their distance on the MCA. This means that these two themes were rarely combined in previous researches, which, from a pure technical first analysis may indicate a coherent gap for future studies. Nevertheless, it may not necessarily represent a theoretical relevant gap, meaning that a study combining these two themes will present a certain level of novelty, but may not offer a contribution to the advancement of theories concerning co-creation of value and coproduction.

5. Conclusions

The present paper is an effort to map the structure and evolution of the co-creation of value and coproduction field of study over the last 32 years (1983-2015). Through a systematic review of the literature produced on this period, we were able to select 451 papers, organize them into seven thematic categories, provide a list of descriptive analyses about the scientific production researched, and discuss the relationship between the many themes and streams of research within the field of co-creation of value and coproduction.

Although this field is over three decades old, we observed that 78.3% of all the scientific production analysed was concentrated in the 2010-2015 period. This suggests that, despite the fact of being a field of study for about 32 years, recent years have seen a considerable growth in academic interest, which means that this field still presents, and maybe more than any other period in time, many opportunities for further studies.

Within the results presented in this paper, a few research gaps can be pointed out. Starting with the incidence of categories in the selected articles, we observed that the most used theme are Business & Strategy and Customers, both appearing in over half the papers considered in this study. This could be explained by the very nature of the co-creation of value and coproduction field. The Business & Strategy theme represents, through many of its keywords, the objectives and results expected and obtained through the adoption of practices for coproduction and co-creation of value. In a similar way, Customers presents part of the equation of what forms a coproduction and co-creation of value. In this sense, it is expected that these categories would

be the most used when analysing the published articles in this field. On the other end of this spectrum, we have Public Sector and ICTs, both represented in 15.5% of the 451 articles selected. In this first level of analysis we can suggest the need for more studies on these two categories, seeing that they are still not as representative as the others.

Considering the results obtained through the MCA, a few other recommendations can be made. As in the other analyses, the Public Sector theme appears as a possible camp for studies, seen that it is the most isolated category. This means that studies in this theme are not usually combined with the other categories. Future researches could explore the relations of Public Sector with other themes such as Innovation and ICTs. Value also appears as an isolated theme, and the same recommendation made for Public Sector can be made in this case. The MCA also points that, besides being one of the most used and highest growing themes, Customers is the link between many other themes. Once again, the nature of co-creation of value and coproduction could explain the highlight on this category. Nevertheless, future studies may use the Customers theme in order to explore and better understand isolated or less used categories.

The gaps and indications for a research agenda presented in this study certainly do not cover every research gap in the co-creation of value and coproduction field, but it may give a direction for future discussions concerning the next years of scientific production in this area. This paper's limitations include the directories and criteria chosen for the search procedures, which may have left part of the production in the field out of the study. Another limitation concerns the criteria of categorization of keywords, seen that other procedures could be adopted in order to arrive at a different set of themes. It is recommended, in future reviews, the use of additional databases of articles as an attempt to collect more papers related to this field of study, as well as a revision of the categories proposed.

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Exploring the features of customer value co-creation in health care: literature review

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Nowadays a patient is more often named as consumer of health care services by considering his / her changed role in the process of services rendering. The concept of a patient as value co-creator obligates health care organizations to change principles of their activity and employees' mentality. Referring to scientific literature of marketing, management, health care and medical, the paper analyses the features of customer value co-creation in health care.

Introduction

Value co-creation has gained the attention of academicians and practitioners as an overarching concept that describes collaboration among multiple actors (Ranjan; Read, 2014). Nowadays various industries become a context of co-creation's researches: IT sector (Stucky et al., 2011; Vartiainen; Tuunanen, 2013); public services (Alves, 2013); tourism (Rihova et al., 2014); financial services (Chan et al., 2010); universities (Díaz-Méndez; Gummesson, 2012); SMEs sector (Ngugi et al., 2010), etc. Besides, many researchers focus on the different aspects of co-creation: customer motives, involvement and engagement in value co-creation (Füller, 2010; Kristensson et al., 2008; Jaakkola; Aleksander, 2015), recovery strategy (Roggeveen et al., 2012); service innovation (Perks et al., 2012); consumer experience (Kelleher; Peppard, 2011), etc.

But value co-creation in health care is in its infancy and raises a number of questions: whether value co-creation result merely from interactions between the physician and the patient (Osei-Frimpong et al., 2015); what health customers think and feel about collaborating with health care providers in co-creating value (Zainuddin et al., 2011); how to create supportive organizational culture towards patient participation, what its component is and how it manifests (Sharma et al., 2014). Thus these as well as other questions concerning the customer value co-creation in health care should be answered.

Nowadays patients are frequently considered as consumers of health care. More and more they take responsibility for the decisions about their health and want to work with health care providers as collaborators (Chewning et al., 2012). To be co-creators of health, patients ought to be supported for this new role and health care providers must adjust their worldview as they become true health care partners (Lorig, 2002). But the patients cannot be active contributors of health care services if supporting processes, methods and tools that enable the co-creation are missed or not suitably elaborated (Elg et al., 2012; Stiggelbout et al., 2012). Hence, value co-creation success requires the changes in attitudes and behaviour both of customers (patients) and health services providers (Cayton, 2006).

The objective of this paper is based on literature review to reveal the features of customer value co-creation in health care. The paper is structured in the following way. In the first section, the brief reconsideration of customer value co-creation is presented. In the second section, the typical features of customer value co-creation in health care are discussed. Finally, some lines for further studies in customer value co-creation in health care are outlined. For preparing this paper the marketing, management as well as health care and medical literature were examined.

1. Conceptualizing the value co-creation

In modern economy the companies have to continuously reinvent themselves in order to adapt to complex and dynamic business environment. The conventional point of view on exchange is being superseded by new forms of interaction. Regarding this point of view, the involvement of the customer in value co-creation is considered and featured as prerequisite for becoming and remaining competitive (Saarijärvi et al., 2013). From co-creation perspective, service providers and customers are no longer on opposite sides, but interacting reciprocity for the development of new business opportunities. It means the mode by which value is created, distributed, paid for, and exploited differs meaningfully from the traditional demand vs supply model (Galvagno; Dalli, 2014). Consequently, the value co-creation is becoming a main concept within different businesses, especially in service business in which market offerings are actually created in the service encounter. How value co-creation phenomenon is defined by different researchers is presented in Table 1.

Definition of value co-creation	Author(s)
Value co-creation is a business paradigm describing how customers could be involved as active participants in the design and development of personalized products, services, and experiences	Prahalad; Ramaswamy, 2004a
Co-creation is more than co-marketing or engaging consumers as co-sales agents. It's about developing methods to attain a visceral understanding of co-creation experiences so that companies can co-shape consumer expectations and experiences along with their customers	Prahalad; Ramaswamy, 2004b
Co-creation is an experience-oriented concept which focuses on the interaction between the firm and the customer	Ramaswamy; Gouillart, 2010;
Co-creation is the process by which mutual value is expanded together, where value to participating individuals is a function of their experiences, both their engagement experiences on the platform, and productive and meaningful human experiences that result	Ramaswamy, 2011;
Value co-creation is a function of direct interaction between customers and providers	Grönroos; Voima, 2013
Co-creation is an interactive, creative and social process between stakeholders that is initiated by the firm at different stages of the value creation	Roser et al, 2013
Value co-creation means that consumers come together with suppliers, service providers or others consumers to generate benefits realized by the user in consumption process	Loane et al, 2014
Co-creation is the joint, collaborative, concurrent, peer-like process of producing new value, both materially and symbolically	Galvagno; Dalli, 2014

Table1. Definitions of value co-creation

Starting point for value co-creation is motivation of involved actors, primarily, of the company and customer. The motivators can be financial, social, technical, and psychological (Hoyer et al, 2010). According to DeFillipi; Roser (2014), for the company, the customer co-creation can provide increased speed to market; lower risk of market failure; better communication of customer needs and interests; higher rates of positive word-of-mouth recommendation; increased adaptability of company business model; early identification of weak signals in the marketplace; better focus on customer experience and journey; focus on value creation, rather than offering technological solutions. Terblanche (2014) maintains that the value co-creation affects the company's ability to supply personalised services using customer input for development better the value propositions, influence positive customer experiences, higher customer engagement, improved customer loyalty, higher customer satisfaction, competencies of employees, higher employee involvement, improved employee loyalty, feedback and learning loops, enhanced profitability (Chathoth et al., 2014). Engaged in co-creation companies are more successful in creating innovations, increase the business reputation and organizational capabilities (Weber; Van der Laan, 2014). Frow et al. (2015) as company's motives for value co-creation indicate access to resources, enhance customer experience, create customer commitment, enable self-service, create more competitive offerings, decrease cost, faster time to market, and emergent strategy and build brand awareness. Hence, we can conclude that companies may experience many benefits from value co-creation. As customers' motives to enter to value co-creation process, Füller (2010) names the differences of their personalities. He distinguishes the customers who are reward oriented, need driven, intrinsically interested, and curiosity driven. Nonetheless, knowing of the co-creation motives from the perspective of the company as well as customer is still scarce (Payne et al., 2008; Dabholkar; Sheng, 2011; Frow et al., 2015).

The value co-creation involves at least two actors/participants/stakeholders. Frow et al. (2015) denote five groups of actors: customers, suppliers/providers, partners, competitors, and influencers (for example, media, government and regulatory bodies). Despite multiplicity of actors, the customer is stated as main subject of value co-creation (Bharti et al., 2014). The co-creation necessitates to view the relationship between the provider and the customer as a continual, dynamic, interactive set of experiences and activities performed by the provider and the customer, within a context, using tools and practices that are partly overt and deliberate, and partly based on routine and unconscious behaviour (Payne et al., 2008).

As process the value co-creation encompasses three important parts: (1) customer value creating processes, (2) provider value creating processes, and (3) encounter processes (Payne et al., 2008). The customers are more and more seen as an important creative, knowledgeable, and motivated resource for firms that can be involved in value co-creation with the company (Saarijärvi et al., 2013; Aggarwal; Basu, 2014). The customer's value creating process is a series of activities aiming to achieve a particular his/her goal or help to develop the provided service (value co-creation *in use* and value co-creation *for others*). Customer activities should be considered as the starting point for introducing the co-creation concept as well as everyday customer practices (Tregua et al., 2015). During the value co-creation the customers undertake different activities that create value in their own right or are instrumental in achieving value later on by playing designer, manufacturer, chooser, order processor, negotiator, payer, consumer/user, quality controller, maintainer, repairer roles (Hibbert et al., 2012); customers act as the feelers, doers, and thinkers

(Arnoud; Thompson, 2005). The execution of customers' roles in value co-creation directs towards their better quality of life (McColl-Kennedy et al., 2012); however, customers must learn to use, maintain, repair, and adapt the provider's offering to their individual needs, usage situations and behaviours (Vargo; Lusch, 2004).

From the company's perspective, the value co-creation begins at the understanding of the customer's value creating processes. The role of service provider's is to facilitate value creation and take part in the value creating process as value facilitators (Grönroos, 2008). Payne et al. (2008) state that the processes that maintain the value co-creation involve: (1) a review of co-creation opportunities; (2) planning, testing and prototyping value co-creation opportunities with customers; (3) implementing customer solutions and managing customer encounters; and (4) developing metrics to assess whether the company is making appropriate value propositions. The value co-creation's opportunities are strategic options for creating value and vary on the nature of service industry, customer offerings and customer base. The opportunities for value co-creation create technological breakthroughs (e. g., digital TV, fourth generation mobile services), transformations in service industry logics (e.g., new channels for reaching customers) and changes in customer preferences as well as lifestyles (e.g., a trend toward greater individuality that influences the customers' wishes to co-create more individualized services). Planning is the next value co-creation's support process; it starts from an understanding how customers co-create the value and requires changing the dominant logic from "making, selling, and servicing" to "listening, customizing, and co-creating" (Payne et al, 2008). Further process is prototyping. The prototypes help to expand existing alternatives, realize future ones and refuse those that are not marketable. The companies usually make the prototypes of environments, encounters, and content. The elaboration of co-creation metrics is the next step in provider value creating processes. According to Payne; Frow (2005), the metrics that providers use to measure the performance of their customer relationships is not well developed. Moreover, the metrics encompass the processes; function and channel should be elaborated (Payne et al., 2008).

Encounter process is the third part of value co-creation processes. Service encounter indicates the existence of contacts between the customer and the service provider. Encounters can be (1) emotion-supporting, (2) cognition-supporting and (3) action-supporting (Payne et al., 2008). From a company's perspective, service encounter quality can be assessed across a range of factors – employees' competence (listening skills and dedication level (Keng et al., 2007) and personal communication (exchange of information and knowledge (Resnick et al., 2014). Service encounter is the critical moment that leaves customers with an impression about the firm. Given the importance of the service encounter, providers should find the ways to manage their customer-employee's contacts to ensure that their behaviours and attitudes contribute to the delivery of expected outcomes (Lloyd; Luk, 2011).

We briefly present the potential actors of value co-creation and marked the exceptional role of customer in value co-creation, discussed the motives of company and customer to enter in value co-creation and introduce to value co-creation process structure. In summarising it is necessary to highlight that businesses diversity supposes that there is no one-size-fits-all approach to value co-creation and firms have to decide on how they will manage their specific co-creation activities (Roser et al., 2013).

2. Features of customer value co-creation in health care

Health care significantly influences world's economies as well as the individuals' quality of life. European health care system is facing serious threat because public health expenditures in the EU's 27 Member States are growing rapidly. On average, they accounted for 5.9% GDP in 1990, and had increased to 7.2% of GDP by 2010. The forecasts show that expenditures may continue to rise 8.5% of GDP in 2060 due to different socio-economic and cultural factors, primarily of aging population (Kantola et al., 2014). Therefore, more attention should be paid to prevention of diseases and healthy behaviour of a population. The traditional view of treating customers as recipients of organisation's activities does not fit well with how customers must engage with health care services providers in order to create the most feasible results. As an alternative, the models of collaborative care, patient-centred (Sweeney et al., 2015), integrated patient care (Singer et al., 2011), person-centred, relationship-centred care (Entwistle; Watt, 2013) are being generated and adopted. This shift can be parallel with the service-dominant (S-D) logic that recognizes the principal role of the customer as co-creator of value and helps to better understand customers' behaviour in health care (Aggarwa; Basu, 2014) (Table 2).

Author (s)	Research scope	Main findings
Nambisan; Nambisan (2009)	Models of consumer value co-creation in health care	Four alternate models of consumer co-creation – the partnership, the open-source, the support-group and diffusion models – are identified and discussed;
Gill et al. (2011)	Concepts influenced the interaction of service participant in the formation of a service	The four concepts – client orientation, client involvement, provider empowerment and client empowerment – are identified as important to service participant;
Elg et al. (2012)	Customer value co-creation for others, i.e. health care service development	A model for co-creation and learning in health care service development is suggested;
McColl-Kennedy et al. (2012)	Patient value co-creation practice styles	Five patient value co-creation practice styles, i.e. team management, insular controlling, partnering, pragmatic adapting, and passive compliance, are uncovered;
Gallan et al. (2013)	Customer positivity as an antecedent to customer participation on value co-creation	Customer positivity predicts participation behaviours, which lead to increased perceptions of service quality and satisfaction. The theory of customer value co-creation should explicitly include affective dimensions and antecedents;
Aggarwal; Basu (2014)	Factors of customer effort exertion in value co-creation	Customer effort exertion is influenced by three factors: personal goal clarity, service relevance and employee interactions. The amount of effort exerted positively impacts customer satisfaction;
Barile et al.(2014)	Interpretation of information asymmetry and the understanding of co-creation in health care service	Three-step interpretative framework for examining the human side of service interaction is proposed. Critical dimensions of affective interaction and co-creation are information sharing (knowledge and facts), interpretation scheme sharing (reciprocal understanding)

		and value sharing (relational harmony);
Karlsson et al. (2014)	Nurturing of service innovation by frontline employees (FE) through value co-creation in health care	Two ways for nurturing service innovation by FE through value co-creation are suggested. First, service innovation integrated with co-creation (service is innovated during direct interaction and collaboration between FE and the patients), second, service innovation detached from co-creation (FE contribute to service innovation back-office by utilizing their previous experience of co-creating value with their patients);
Krisjanous; Maude (2014)	Customer value co-creation within a partnership model of health care	Midwifery Partnership Model (MPM) as facilitative of customer value co-creation is submitted; 15 dimensions in which midwifery customers co-create value through partnership are identified;
Loane et al. (2014)	Consumers' value derived from online health communities	The results that online communities give consumers the opportunity to create and experience forms of consumer value that would not otherwise be available in a traditional health delivery system are demonstrated;
Sharma et al. (2014)	Organisational capabilities for customer participation in health care innovation thought the lens of co-creation	Four categories of organizational capabilities are identified: customer activation, organisational activation, interaction capabilities, and learning agility;
Osei-Frimpong et al. (2015)	Value co-creation processes from dyad of the patient and the physician	Three critical areas needed to support value co-creation process are identified: social context, beliefs and perceptions, and partnership between the studied dyad;
Sweeney et al. (2015)	Customer effort in value co-creation (EVCA) in health care; the link between EVCA and quality of life, satisfaction with a health care service and behaviour intentions	A hierarchy of activities representing changeable levels of difficulty for the customer is proposed; 13 activities take place both within the firm (clinic) and beyond it and patient self-generated activities are revealed; the influence of customer EVCA on quality of life perceptions as critical finding is fixed;
Zhao et al. (2015)	Motivators of activities in value co-creation in online health communities (OHC)	Social identity as essential determiner of patient value co-creation in OHCs is founded;

Table 2. Overview of value co-creation's studies in health care

Today the main question for health care executives is how to build health care system and deliver high quality care in ways that are beneficial for both patients and health care organizations. Cosgrove et al. (2013) suppose that each health care organization must activate patient involvement into the service provision's processes by building the roles for patients because more participatory health care customers lead to better medical outcomes, lower costs, more effective and efficient health care delivery, and increased perception of service quality and satisfaction (Gallan et al., 2013).

What implications for health care managers can be formulated based on the findings of patient (customer) value co-creation studies? Gill et al. (2011) accentuate the reinforcement of open organisational culture, which empowers patients to apply their knowledge and skills and encourages them to make the choices and take the initia-

tives in service co-creation process. Open organisational culture helps to recognize and accommodate patients' individual medical needs and preferences for health care (Singer et al., 2011). For development of open organisational culture it is necessary that health care leaders should implement initiatives including system-wide standards of behaviour; rotation on inpatient units; follow-up calls to all discharged patients to make sure they understand their care instructions; a defined process for employee interactions with patients focused on helping to reduce anxiety and fair, etc. (Hegwer, 2014). The open culture is the condition of more involved and confident patients and doctors tend to maintain the collaborative relationships with patients and encourage their patients to be active and conscious in making decision of health care (Street et al., 2003). The idea of health care organization's openness that helps to envisage customers' value co-creation desires and unlocks the opportunities for them to involve in co-creation advocated by Krisjanous; Maude (2014) too. The findings of Gill's et al. (2011) research also could be used by managers in defining position statement for high contact, high involvement, ongoing services and their succeeding recruitment and selection criteria as well as to staff training that should improve the interactions of managers with their service provision personnel, and service provision staff with their clients.

Value co-creation is not the consequence of merely interactions among the actors; it requires the examination of other attributes to deeper conceive the linkage among the actors. The social context of service encounter, the beliefs and perceptions both of the patient and the doctor and their partnership are imperative for value co-creation process (Osei-Frimpong et al., 2015). Thus health care organizations need to take a holistic view of service delivery and acknowledge all fateful areas of the value co-creation process given for patients the roles of active participants.

As mentioned the customer's participation in health care is critical to achieving the expected outcomes of service. Obviously, the participation of patients' meaningfully diverges due to anxiety-producing situations, uncertainty and risk. Galan's et al., (2013) research aimed to underlying processes responsible for the effects of customer to act on outcomes during a customer's co-created experiences provides few implications for health care service managers and staff. First, health care managers should influence customer affect by designing service interactions via service blue-printing, service mapping or other tool for service delivery design. It allows identifying how and where it is possible to enhance or reinforce patients' positivity and improving managers' abilities to correctly design the physical environment and aligning service delivery capabilities with customer resources and preferences. Second, medical personnel must listen to and translate customer anxieties and preferences into option for specific follow-up behaviours, with at least one of the options available to the patient without unnecessary delay. Third, health care professionals should open their practices helping patients recognize and manage their emotions to facilitate positivity and urge them to be involved in the health care service delivery.

The participation of customers in health care service delivery differs by levels of their efforts. Sweeney et al. (2015) define the customer's effort in value co-creation as the degree of the effort that customers apply to integrate resources, through a scope of activities which describe by different perceived difficulties and propose a hierarchy of these activities. Based on these findings health care organizations can develop strategies for facilitating and encouraging customers to take part in activities, especially those activities that need more customers' efforts. The health care service providers must recognize that their customers diverge in their skills, abilities, and willingness to

co-create value through within-clinic, outside-clinic and self-generated activities. The patient's effort involved in value co-creation should be influenced by personal goal clarity; service relevance, and employee interactions (Aggarwal; Basu, 2014). The comparable idea is maintained by McColl-Kennedy et al. (2012). They suggest that customers co-create value differently, demonstrating variety activities and integrate resources in different manners through interactions with different collaborators such individuals from the focal organization, other market-facing and public sources, private and personal sources. The researchers revealed five health care customer value co-creation's practice styles (team management, insular controlling, partnering, pragmatic adapting, and passive compliance) with different customer roles, activities, and interactions. In these activities which define the style of value co-creation the information plays a principal role, because sharing of information is a key process in actors' interaction and co-creation. Traditionally the health care service, particularly the relationship between the physician and patient, is affected by information asymmetry. According to Barile et al. (2014), this asymmetry might not be merely handled as an asymmetric quantity of information but rather as cognitive abilities with varying interpretations schemes. Therefore, the main mode to reduce such information asymmetry is to recover conditions of consonance by acting on the building of trust-based relationships. Hence, the health care organizations should re-evaluate the suitability of their business models and deeper understand their customers' practice styles as well as the factors that make an influence on these styles. This is important aiming to operate more effectively in increasingly networked and collaborative market (McColl-Kennedy et al., 2012).

Nowadays the customer value co-creation cannot be viewed beyond the unceasing development of new information and communication technologies such as online health communities and social media technologies. The four alternate customer value co-creation models – the partnership model, the open-source model, the support-group model, and the diffusions model proposed by Nambisan; Nambisan (2009) can help health care organizations adopt applicable strategies and practices to incorporate customers as partners in development and delivery of innovative health care service. Loane et al. (2014) declare that online health communities give customers the possibility to create and experience forms of the value that is not accessible in a conventional health care delivery system. Their research highlights the significance of peer-to-peer health networks that eliminate or reduce the barriers of information asymmetry and provide value and maintenance to defenceless people, especially for people with serious illness and limited capacity for involvement in conventional community life. Health care managers should realize that the treatment is only one part of the value aspired by customers. Respect, play, aesthetics, spirituality and ethics compose other “slices” of the value derived from customer encounter with health care system. The administrators of online health community must clearly define their community mission; encourage members' mutual caring through relevant policies; intentionally design the website that could facilitate members to communicate using multiple means, such as recorded voices, icons, animation, and text messages (Zhao et al., 2015).

Service development may be carried out from two perspectives: (1) *inside-out* which explains service development in health care through the lens of organization and (2) *outside-in* which views the service development through the lens of the customer. The health care organization often follows the *inside-out* perspective that frames the patient as passive actors with a limited role. Elg et al. (2012) take notice of customer as value co-creator *for others* (*outside-in*) in development of health care services and

claim that customer co-creation is a powerful mechanism in service development. The crucial issue for practitioners is how the process of co-creation and learning from the patient can be organised and managed. The researchers delineate few issues that need to be considered by providers: (1) each patient should feel protected and be sure that participation in service development will not influence his/her future contact with the doctor and other medical personnel; (2) anonymization should be ensured in respect to the professional and patient relationship as well as the patient privacy; (3) the selection of tools served for maintaining the flexibility of patients should be closely considered; (4) the choice of patients which will be involved in health care service development is a critical activity, consequently, both the health care staff and researchers should be entered in sampling; and (5) the learning from the patient can offer alternatives for different situations.

The value co-creation may be considered as the prerequisite of health care service innovation. In this regard, Karlsson et al. (2014) accentuate the contribution of front-line employees. They nurture the service innovation through value co-creation in two ways. First, service is innovated during direct interaction and collaboration with the patients in certain context (service innovation integrated with co-creation), and, second, frontline staff joints to service innovation back-office by using their preceding experience of co-creation value with patients (service innovation detached from co-creation). To ameliorate the quality of encounter as medium for service innovation integrated with co-creation the health care organization can apply employees education and training, regular assessment and feedback, watchful recruitment and incentive structures (Aggarwal; Basu, 2014). Many health care organizations still lack a comprehension of the capabilities required to adequately react for enhancement of patient's participation. Sharma et al. (2014) suppose that health care organizations considering increased participation of patients should develop organisational capabilities that allow encouraging and supporting patient participation in health care innovation. Furthermore health care service providers require the capabilities to identify and respond to dynamic patients' needs. Given the complexity of many health care organizations managers should stimulate collaborative integration and leadership in organization. The researchers highlight the importance to develop the organisational capabilities that allow to effectively interacting with patients. It means health care organizations would need to recognize patients as personalities in order to build and evolve them, act ethically. Moreover managers must build capabilities to learn from evaluation, and change the processes that hinder to service innovation adoption and diffusion. It is critically important for health care organization to be perceived as knowledgeable, helpful, and customer-focused.

3. Future research lines in health care customer value co-creation

Despite increasing number of studies, the inquiries of customer value co-creation in health care remains scarce. The researchers identify potentially fruitful avenues of studies: the situational and personal factors, the customer value co-creation scale development and validation, the longitudinal changes in customer value co-creation and impact on organizations (McColl-Kennedy et al., 2012); the link between information asymmetry and value co-creation (Barile et al. (2014); the forms of nurturing service innovation through frontline personnel and patients co-creation in different

fields of health care (Karlsson et al., 2014). The health care service includes the different professionals who also cooperate with the patients and enter the value co-creation process. Thus, future studies cannot restrict the doctor-patient; it is necessary to expand the research focus on other professionals and managers participated in health care service delivery (Osei-Frimpong et al., 2015). Barile et al. (2014) suggest that researchers should investigate deeper patients' motives to be involved in health care management in both self-help and collaborative participation. Elg et al. (2012) pose the question that may be answered how health care organisations can develop services from the perspective of patients (co-creation *for others*). Online health communities become a form of service provided by health care organizations to expand face-to-face services for people with particular health problems. In this regard, the future researches should answer which health problems are appropriated for online peer-initiated support and how the structure and functional way of online health community contributes to the perceived value of the experience (Loane et al., 2014). Zhao et al. (2015) take a notice that further studies should examine how different illness attributes and online health community members' demographics characteristics influence customer value co-creation. We provided only a few sketches for further studies. All studies that deepen understanding how patients co-create value to better conduct their health care and how health care organization must manage is important for patients, as well as health care services providers, are welcome.

Concluding remarks

In contemporary service economy, the value co-creation is a progressively evolved concept within service research and practice. The value creation pivots on the idea that value is generated by interaction among service providers, customers and other co-creators. The customers are no longer passive recipients of value propositions offered by service providers. They are now informed, connected, networked, and empowered as never before. To be competitive service organizations invent new business practices and competencies that need shifting organizations' attention from production to consumption, from service product to process, from transaction to relationship and create the environment that facilitates co-creation and interactions between customer and service organization's staff. A service business is multifaceted; thus there is no universal approach to customer value co-creation and organizations have to decide how to manage their specific co-creation activities and gain positive outcomes but also to avoid possible negative implications of co-creation for an organization.

Customer co-creation in health care is still new practice. The health care is requiring patient's active participation to ensure successful outcomes (Gill et al., 2011). But health care context is rich in complexity and unique challenges for patient participation (Sharma et al., 2014) as well as for service providers. Despite the changes of paternalistic model of health care to more patient-centred pattern and becoming of patient involvement in all health care delivery essence that ensures the responsiveness of services provided to what patients want and need (Pollard et al., 2015), more efforts should be performed to direct attention of both providers and patients towards successful customer co-creation.

We recognize that this research has many limitations. However, as an exploratory article, it provides the stimulus for further research.

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Knowledge-intensive business services: testing a multi-dimensional model in the Basque Country

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The main goal of this paper is to propose and validate a method for the analysis of value creation in the KIS (Knowledge Intensive Services) from a perspective of strategic definition at a micro-economic level (twofold offer-demand approach) that allows:

- *An understanding of the critical factors that define the relationships between companies that demand and offer KIS (how and why they are produced).*
- *An approximation to a method capable of showing the level of complexity of advanced services as a contribution towards overcoming the characterisation of KIBS through NACE.*

1. Introduction

In the field of innovation and the improvement of the competitiveness of enterprises, knowledge-intensive business services, or KIBS, play an essential role in improving the key processes and activities of client companies. This fact becomes more relevant in the current economic context, where the industrial crisis forces us to rethink the way that small and medium enterprises have traditionally done things in our local environment, in order for these to be competitive globally.

In this context, this study aims to analyse the keys to the customer-supplier relationship between companies that demand and provide advanced services. For this we have used the model of analysis proposed by Miles (2012) in which the information flows that take place between the company that supplies the services and the client company are studied. Following this approach, we have studied the case of two companies: EGA Master, a leader in the hand tools sector, which offers a comprehensive solution with ten highly innovative product ranges, whose business model is based on the horizontal integration of suppliers; and Abantail, which offers a specialised and comprehensive design service for the optimisation of Adaptive Design at company level.

The goal of the research carried out is to propose and validate a method for the analysis of value creation in the KIS (Knowledge Intensive Services) from a perspective of strategic definition at a micro-economic level (twofold offer-demand approach) that allows:

- An understanding of the critical factors that define the relationships between companies that demand and offer KIS (how and why they are produced).
- An approximation to a method capable of showing the level of complexity of advanced services as a contribution towards overcoming the characterisation of KIBS through NACE.

In this paper, the methodological design of the research that will drive the validation of the new model proposed is describe. The research will be conducted during the following months.

2. Conceptual framework for knowledge-Intensive services

The service sector is one of the fundamental pillars supporting today's global economy. The growth trend of the sector has been unstoppable in recent years, especially in large metropolitan areas or large urban agglomerations in general. In recent decades, the services sector has become increasingly significant compared to the industrial sector. Even within the industry itself, there is a very marked tendency to combine products with a layer of high added value services as a way of increasing their value in the market.

In the knowledge economy, services such as R&D services computer activities, engineering and consultancy services are all examples of an emergent economy where knowledge takes a relevant place, taking into account that they depend on professional knowledge (related to specific technical fields) and they provide, at the same time, intermediate products and services that are knowledge based (Miles et al.,1995). These are the so called knowledge intensive business services (KIBS), tend to concentrate at metropolitan and well developed regions in contrast to less developed regions, where the presence of these activities is much poorer as they usually depend on the external provision of KIBS (González-López, 2009).

Many authors (Bilderbeek and Hertog, 1998a; Bilderbeek et al 1998; OCDE, 2006) give special importance to KIBS as facilitators, carrying and being a source of innovation. This is why they can easily collaborate with the traditional knowledge system, universities and public research centers, or act as "bridges to innovation" (Czarnitzki and Spielkamp, 2000), facilitating the knowledge exchange between agents due to the high number of interactions amongst them. As an example, KIBS might facilitate their clients' innovations by helping them adopt solutions previously developed in other sectors or companies, for example, any software solution (Gonzalez-Lopez, 2013). Related to this idea, Miles (2008) stands out that KIBS uses different types of highly specialized knowledge, in order to develop specific solutions for their customers.

An advanced service has traditionally been understood to be any activity covered by specific NACE 2 categories, particularly activities belonging to the groups between 69 and 75 - which relate to professional, scientific and technical services - and between 77 and 81, which encompass support activities and administration.

However, this approach seems increasingly reductionist and unsuitable for a rigorous analysis with a view to making important decisions. According to recent studies conducted by MIK during 2014 and 2015, not all activities that are strictly classified within a specific NACE code actually turn out to be advanced services if we look a little more closely at the qualitative aspect of the service. For example, a business that is categorised under “Computer consultancy activities” may be offering basic services (developing a website) or much more advanced services (providing advice on the latest Big Data technologies and techniques, for example). In our opinion, the criterion for the classification of the sector is not sufficient to identify an advanced service, and instead there is a need to establish another series of conditions to understand that we are dealing with a service of this type (Hipp, 1999; Muller & Doloreux, 2009).

Some authors such as Muro et al (2015) are already applying this perspective in their research about advanced services or industries, for these authors, advanced industries should fulfil these conditions:

- An industry’s R&D spending per worker must fall in the 80th percentile of industries or higher, exceeding \$450 per worker.
- The share of workers in an industry whose occupations require a high degree of STEM knowledge must also be above the national average, or 21% of all workers

As a result of applying both characteristics to the USA economy, 50 advanced industries have been identified as can be seen in Figure 1.

Figura 1 Las 50 industrias avanzadas en USA

The 50 Industries That Constitute the Advanced Industries Sector		
MANUFACTURING		ENERGY
Aerospace Products and Parts	Motor Vehicles	Electric Power Generation, Trans., and Distribution
Agr., Construction, and Mining Machinery	Navigation, Measurement, and Control Instruments	Metal Ore Mining
Aluminum Production and Processing	Other Chemical Products	Oil and Gas Extraction
Audio and Video Equipment	Other Electrical Equipment and Components	SERVICES
Basic Chemicals	Other General Purpose Machinery	Architecture and Engineering
Clay Products	Other Miscellaneous Manufacturing	Cable and Other Subscription Programming
Commercial and Service Industry Machinery	Other Nonmetallic Mineral Products	Computer Systems Design
Communications Equipment	Other Transportation Equipment	Data Processing and Hosting
Computers and Peripheral Equipment	Pesticides, Fertilizers, and Other Agr. Chemicals	Medical and Diagnostic Laboratories
Electric Lighting Equipment	Petroleum and Coal Products	Mgmt., Scientific, and Technical Consulting
Electrical Equipment	Pharmaceuticals and Medicine	Other Information Services
Engines, Turbines, and Power Trans. Equipment	Railroad Rolling Stock	Other Telecommunications
Foundries	Resins and Synthetic Rubbers, Fibers, and Filaments	Satellite Telecommunications
Household Appliances	Semiconductors and Other Electronic Components	Scientific Research and Development
Industrial Machinery	Ship and Boat Building	Software Publishers
Iron, Steel, and Ferroalloys	Medical Equipment and Supplies	Wireless Telecommunications Carriers
Motor Vehicle Bodies and Trailers	Reproducing Magnetic and Optical Media	
Motor Vehicle Parts		

Fuente: Muro et al (2015)

We believe that one of the keys to generating high value-added services has to do with the relationships that exist both upstream and downstream in their value chain. To take these key points forward, in the following “Methodological Approach” section

we have selected a theoretical model and a series of propositions that characterise advanced services in a way that goes beyond the NACE 2 classification and that will be the basis of our research.

2.1. Methodological approach

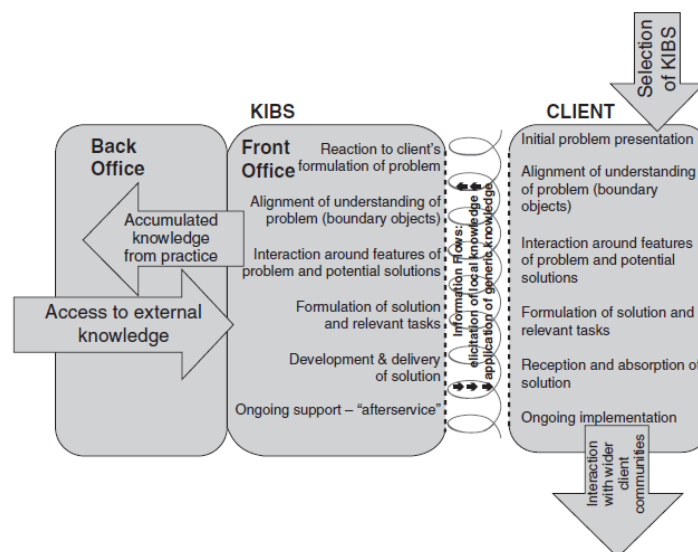
In general terms, the methodological design of this study consists of three phases: the first phase involves a literature review and selecting the theoretical model to explain the phenomenon of advanced services; the second phase is focused on designing and carrying out case studies in order to validate the proposed theoretical model; and, finally, the third phase is where the model is adjusted and new ways for validating and implementing it will be defined.

The methodology to be used in each of the phases is detailed below.

- a. **Phase 1 - Literature review and selecting the theoretical model to explain the phenomenon of advanced services:** The literature review has allowed us to determine the critical factors in the problem of advanced services. During this phase, we have identified a theoretical model capable of explaining relations between companies that supply and demand knowledge-intensive services, and a proposal is made regarding conditions that would characterise advanced services.

As far as the theoretical model is concerned, we selected the model developed by Miles (2012: 19) on the basis that it describes the relationships that exist between KIBS and their clients. This model also includes key questions to guide research, which have been useful in the process of analysis.

Figure 2: Model of the KIBS - Client relationship

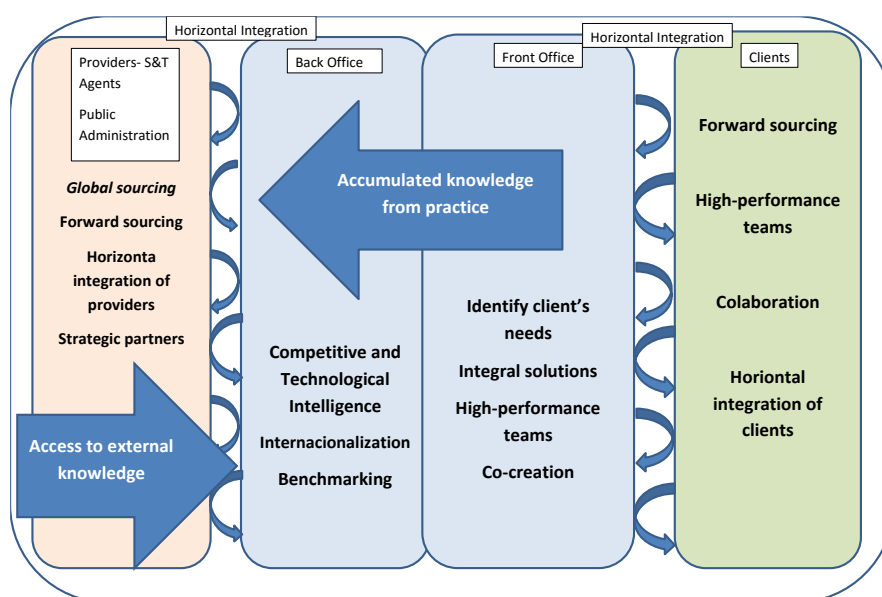


Source: Miles, I. (2012:19)

Nevertheless, during 2014 and 2015, different exploratory research studies were carried out by MIK where more than 120 KIS enterprises were interviewed and

analysed. One of the main insights of that research showed that not all the companies officially belonging to the particular NACE-KIS groups, were qualitatively considered as “advanced” and viceversa. The second one, is that if we had a deeper look to the type of services they were offering and the relationships with external agents, the model proposed by Miles (2012), shown in Figure 1, doesn’t take into account the provider side, to the same extent that it does take the offerent side. To explain both we are proposing an adaptation of that model that can be seen below in Figure 2.

Figura 3: Proposed theoretical model



Source: Prepared by the authors based on Miles (2012:19)

Regarding the conditions for the categorisation of advanced services (to overcome the traditional NACE classification), the literature review has allowed us to define five conditions to enable us to categorise a service as an advanced service, and which are proposed based on the results of the research carried out by Hipp (1999), Muller and Doloreux (2009), Muro et al (2015) and Miles (2012):

- These are companies that offer services which are required by other companies and not by the end consumer. Business to business demand.
- They carry out complex operations of an intellectual nature where human capital is of fundamental importance.
- They establish a relationship based on close collaboration, co-creation, and cooperation with their customers.
- Their service is an important element of added value in the competitive positioning of their customers.
- They work together with customers, R&D centres, universities etc., to build systems for creation and for the application of knowledge all around them. In other words, they form a bridge between the world of knowledge and the company.

- b. **Phase 2 - Designing and carrying out case studies:** We will use the case study methodology for validating the proposed model, based on the definition put forward by Yin (2009). Designing the case studies therefore involved defining the unit of analysis and the method of collecting and analysing data.

A design involving multiple cases has been chosen in order to address knowledge-intensive services from the perspectives of both supply and demand. A single unit of analysis has also been established (the behaviour of the organisation in relation to the areas mentioned). In conclusion, it is a multiple-case design, which is also holistic (single-unit of analysis).

To implement a first pilot test, we have identified two companies that satisfied the profile required to test if the research was conveniently designed, from two different viewpoints: (i) we selected a company which provides advanced services to the industry and which has experienced significant growth in recent years; this company enabled the model to be applied from a supply-side perspective; (ii) we also selected another company which competes in niche markets with high added value and which requires advanced services (demand-based approach), these being essential to their value proposition.

- Case 1. Supply-side approach: Abantail S.Coop: This company was set up recently (in 2004) and is located in Arrasate (Gipuzkoa, Basque Country-Spain). It is a spin off from a technology centre which has chosen to develop a high value-added strategy to enter a mature market; the company has therefore opted for a competitive strategy based on differentiation, with the aim of becoming part of their customers' production process to help them increase the value that they bring to the market.
- Case 2. Demand-side approach: Egamaster SL: This is a hidden champion located in Vitoria (Álava, Basque Country-Spain). It is a business with high added value; knowledge intensive activities support its value proposition and make it a leader in the sector. It has developed strategic alliances to overcome the competitive challenges and difficulties associated with its size (SME).

Table 1 details the main features of the selected companies that form part of the pilot testing of the research method.

Table 1: Description of cases used in the pilot testing

Company	Size	Sector	Age	Location	Markets	Type of legal entity
Abantail	Small Turnover €1M-€2.5M Empl.:26	Advanced services	2004	Arrasate (Gipuzkoa, Basque Country-Spain)	Local	Cooperative
Egamaster	Medium Turnover: €5M-€10M Empl: 107	Metal	1990	(Álava, Basque Country-Spain)	150 countries	Public limited company

Source: Compiled by the authors.

In order to ensure that the further study is valid, reliable and accurate, information will be collected by means of: (i) semi-structured interviews with the en-

trepreneurs and current managers of the company. Lasting between 90-120 minutes and following a protocol with open questions, these interviews derived from a diagnostic model of the resources and capabilities of the companies, based on the guidelines contained in the the European Commission's Smart Specialisation Strategy and investigations on the subject in question (Davidsson, 2004: 127-129; Goodsell, 2007); (ii) other internal sources of information from the companies, such as brochures, financial reports and forecasts; and (iii) external sources such as reports by official organisations associated with the company.

This information will be therefore analysed in two stages: in the first stage, a database will be created with the transcripts of the interviews and the secondary information; and in the second stage, the evidence obtained will be analysed following the logical schema of the defined theoretical model, relating the behaviours identified in the case studies with the propositions and their associated indicators (pattern matching and combination of qualitative and quantitative information). In this process of analysis, it is essential to use the system of propositions defined specifically for this study, which can be seen in Table 2.

Tabla 2: A set of propositions to overcome the traditional classification of KIS.

Propositions to characterise KIS	Indicators
1 Business demand – B2B relationships between suppliers and customers <i>These are companies that offer services which are required by other companies and not by the end consumer.</i>	<ul style="list-style-type: none"> • % turnover companies/total turnover • Number of explicit processes in which suppliers are involved/Total processes • Number of explicit processes in which customers are involved/Total processes • Relative importance of the process for the organisation – Scale of 1 to 10
2 Complexity and Human Capital and Degree of Specialisation. <i>They carry out complex operations of an intellectual nature where human capital is of fundamental importance.</i>	<ul style="list-style-type: none"> • % of graduates/Total staff • % expenditure on R&D/Revenue; training • Index of specialisation in R&D activity in the technological/scientific sphere¹ • Number of people in each area of specialisation²
3 Co-Creation ratio <i>They establish a relationship based on close collaboration, co-creation, and cooperation with their customers</i>	<ul style="list-style-type: none"> • % of sales of standardised projects v customised projects v standard core + customisation layer³ • Extent to which the customer is involved in the production of services, on a scale from 1 to 10⁴ • Extent to which the supplier is involved in the production of products and/or services, on a scale from 1 to 10

¹ The Basque Science and Technology Network measures specialisation using the following indicator: “*Index of specialisation in R&D activity in the technological/scientific sphere*”

² Miles, 2012:22 identifies three areas of specialisation within KIBS (Miles, 2012: 23, graph 1.2): technical/technological knowledge (T-KIBS), knowledge of professional, legal, consultancy services (P-KIBS) and creative knowledge, involving design, communication (C-KIBS)

³ Doroshenko et al (2013) use the following question to clarify this point: “*What share of your sales value in 2010 falls into each of these categories? Standard/Standard with a customised Shell/Customised*”

⁴ Doroshenko et al (2013:17), analyse the question in this way: “*Estimate the extent to which the customer is involved in the production of services, on a scale from 1 to 10.*”

4 Added value and competitiveness

Their service is an important element of added value in the competitive positioning of their customers.

- Number of products/services offered jointly with customers/Total products/services offered
- Number of products/services offered jointly with suppliers/Total of products/services offered
- Number of spin-offs created
- Number of joint ventures with other companies

5 Knowledge Systems

They work together with customers, R&D centres, universities etc., to build systems for creation and for the application of knowledge all around them. In other words, they form a bridge between the world of knowledge and the company.

- Number of projects/investment in collaboration with the system of innovation
- Transfer, applicability, development etc. of knowledge in the practices, proposals etc. of the organisation
- Importance of universities, technology centres etc., on a scale from 1 to 10.
- Number of key processes in which an agent from the Knowledge System intervenes.

Source: Compiled by the authors.

- c. **Phase 3 - Adjusting the model and identifying future lines of research:** A system has been established to identify and record deficiencies in the theoretical model and this will be applied throughout the data analysis process. The deficiencies identified will be analysed in depth and areas of improvement will be included after another literature review (specifically for the deficiencies identified). These areas of improvement will be validated by experts in the relevant fields. Such as the expert in KIS, Ian Miles, with whom we have contrasted the preliminary design of our research.

Throughout this process, the basic propositions will be taken into account in order to establish whether or not the model is capable of describing how and why the process of value creation in the sector of advanced services occurs, from the perspective of the strategic definition at microeconomic level (twofold supply-demand approach).

It is worth noting that a protocol has been designed due to the importance of replicating the study in order to continue with the process of validating the theoretical model. This protocol details the process of selecting the cases, as well as the process of collecting and analysing the data.

3. Exploratory research.

During 2014 and 2015, MIK has conducted several research projects in the field of services, which have shown the importance of generating a model to analyze the qualitative aspects of KIS not only in the offerings side, but also in the provider's one. For that reason, we have selected two companies that appear to have specific characteristics from both sides.

3.1. Knowledge-intensive services – a view from the perspective of demand

Table 3: EGA Master

Company	Size	Sector	Age	Location	Markets	Type of legal entity
Egamaster	Medium Turnover: €5M- €10M Empl: 107	Metal	1990	(Álava, Basque Country-Spain)	150 coun- tries	Public limited company

Source: Compiled by the authors.

EGA Master is a company dedicated to the conception, design, manufacture, control, commercialisation and after sales service of high quality equipment and hand tools for industrial-professional use, as well as highly specialised safety equipment, within the metal sector.

EGA Master exports all the items in its catalogue (i.e. 20,000 product references) to more than 150 countries and exports currently account for almost 90% of its production.

EGA Master has opted for a differentiation strategy with respect to its competitors, through innovation and constant development, that allows it to have a continually expanding and increasingly complete range, with the aim of having an increasingly comprehensive offer that is capable of satisfying all the needs of the industry and the professionals working in it, increasing the level of service offered; in other words, to become a single-source supplier capable of meeting 100% of customer requirements.

Addressing the needs of its customers, who do not want to depend on many suppliers to meet their demand for tools – preferring to focus on those who can will fully meet all their needs so that they can streamline their purchases and reduce administrative and transport costs etc. – it has optimised its portfolio of products/services to become this single-source supplier that the customers are looking for.

In this way it has become the only global manufacturer of tools that provides a comprehensive solution with ten highly innovative ranges: piping tools, general mechanical tools, pneumatic and hydraulic tools for underwater applications, non-sparking, titanium non-magnetic, electrostatic discharge (ESD) tools, tools insulated up to 1000 volts, anti-drop tools, tool control systems and explosion-proof and intrinsically safe instruments with ATEX/IECEX certification. There is no manufacturer in the sector anywhere in the world that is able to offer these 10 ranges of tools.

All this comes with a unique and totally innovative service in the sector: the customer's own brand without any charge whatsoever for this service, without additional costs and maintaining the same delivery deadlines as with the EGA Master brand. There is no other manufacturer in the sector providing these conditions: all the advantages of the customer's own brand without any of the drawbacks (minimum amounts, higher prices and longer delivery times).

The same can be said of the innovative and revolutionary services that the company has brought to the sector, being pioneers and still unique in many of these services:

their own brand with all its benefits to the customer without any of the traditional drawbacks such as minimum amounts, lengthening of delivery times and higher prices; catalogues customised for specific customers with their own brand, logo and corporate style without any development costs for these (this good practice and innovative service earned the European Award for Best Practice in Innovation of the EFQM Forum); personal advisory service on safety and risks of explosion for choosing the correct alloy for non-sparking tools; unlimited guarantee for all its tools; catalogue of specific safety tools, unique of its kind in the world and published in 7 languages; comprehensive customer service that covers all their tool needs etc.

In summary, the success of these products and services is based on:

- Incorporating the voice of the customer in all processes to guide the capturing of their needs and expectations, looking at the same time for new opportunities in these. Complete empathy with the customer.
- Innovation based on implementation and creation of value for the customer. In other words, the realisation of ideas into products or services that provide solutions to those needs and expectations gathered from the customer. Value-added proposals aligned with customer needs.
- Proper transmission to the customers of the keys to the new proposals for adding value.

3.2. Knowledge-intensive services – a view from the supply-side perspective

Table 4: Abantail

Company	Size	Sector	Age	Location	Markets	Type of legal entity
Abantail	Small Turnover €1M- €2.5M Empl.:26	Advanced services	2004	Arrasate (Gipuzkoa, Basque Country-Spain)	Local	Cooperative

Source: Compiled by the authors.

Abantail is a spin-off from two companies that are part of the Mondragon Corporation: LKS, a business services consultancy belonging to the industrial division of the group; and Ikerlan, a research centre specialising in the development of R&D projects under contract for the creation of new products and for the improvement of production processes, located within the Knowledge division of the corporation.

Abantail offers a comprehensive service for the optimisation of adaptive design. This is the design carried out during the order fulfilment cycle and the aim is to customise the product according to the specific needs of each customer for each order.

The service offered by Abantail allows the design of customised products using standard product logic. According to its own testimony, adaptive design “is the ability to design different articles, ‘customised products’, based on the same template or ‘generic product’, which incorporates the anticipated future adaptations. The generic product refers to the set of all articles that can be provided by the company on a

competitive basis and incorporate the anticipated future adaptations, while the customised product is each of the adaptations made to the generic product, i.e. each article that is sold to the customer”.

In many cases, the job of customising a product entails a high cost in terms of time, personnel and materials, which affects the price and the delivery of products, therefore making it less competitive. Abantail succeeds in combining the option to optimise costs while providing a customised service. In this way, it offers its customers the possibility of customising their products manufactured “en masse”, overcoming the typical problems of the mass production paradigm and providing the customisation required by the new producer-consumer trends (mass customisation).

The business operations of Abantail are based on the optimisation of adaptive design as a strategy for industrial competitiveness. It offers a “turnkey” service, including prior diagnosis, product-process consulting, the development of adapted tools and the relevant training.

It has sales configurators for creating quotations, calculating rates and costs and budgeting, as well as technical product-process configurators for the structuring of the generic product and generation of technical documentation, and is able to adapt the most appropriate IT solution for each customer.

As well as offering an advanced service capable of making its customers the most competitive, one of the keys to the success of its value proposition is its commitment to innovation. In addition to the fact that the service itself constitutes an important source of innovation, Abantail focuses its R&D activity on the development of new products, with the aim of: extending the range, entering new markets and adapting products/services to the needs of customers. For this, a budget is allocated to innovation activities, primarily for internal and external R&D.

Also, with respect to the human capital, between 75% and 100% of the workforce has a university education, and between 10% and 25% participate in R&D activities. The company seeks public support for the development of R&D projects at provincial, regional, national and European level. It cooperates in innovation projects with other agents, such as universities, technology centres and the customers themselves.

4. Conclusions

The research carried out will contribute significantly to the literature in terms of the 3 previously identified key principles of investigation, which form the basis of the research carried out: theoretical model, conditions for the categorisation of advanced services and case studies.

- Theoretical model: based on the findings of Miles (2012), a new model is presented to explain the phenomenon of advanced services from the perspective of a twofold approach (supply-demand). This model will be capable of providing a significant contribution, with the identification and management of critical factors in the processes analysed, adding to the existing body of knowledge

and providing an opportunity to transfer this knowledge to companies and other organisations associated with this research topic.

Figure 2 provides an overview of the theoretical model and features the introduction of a new element to the initial model proposed by Miles (2012): a new column for suppliers of both technical elements and knowledge who “push” the activity of the company to provide a product or service with greater added value. Having analysed different exploratory studies in services companies from the perspective of supply and demand, we consider it appropriate, given the importance of the incorporation of external knowledge and the creation of a network of partners-suppliers for the operations of advanced services companies, to provide them with flexibility and make the value proposition of the companies more competitive.

- Conditions for categorisation of advanced services: Through this research it will be possible to check the initial proposal formulated against the 5 conditions in order to categorise a service as advanced. We believe the research will be useful for the incorporation of new indicators to support the proposals made and improving on the classification of advanced services through NACE. Below, the final version of the proposals and indicators is presented for evaluation.
- Case studies: Despite the fact that the main objective of this research has not revolved around the selected cases and their specific conclusions, and that these have instead served as the scope of application for the defined theoretical model, it can be said that these provide important findings and raise new research questions. Both cases provide food for thought concerning the process of strategic definition at microeconomic level and the challenges of SMEs in the new competitive environment, in which the generation of high impact value propositions constitutes an essential requirement for businesses situated in environments in which the management of production costs is no longer enough to develop a long-term business strategy.

5. Future lines of research

This exploratory study has allowed the development of an approach to the study of the field of advanced services in order to improve on the traditional classification based on NACE, attempting to find the keys to characterise this type of service from a qualitative perspective, in terms of the extent to which they display each of the five previously defined characteristics:

- **Business demand**: What is the optimum percentage of services invoiced to other companies to consider a service “advanced”? Would it be useful to clas-

sify the client companies based on parameters such as size, sector of activity, turnover etc. to further refine the characterisation of the service?

- Human Capital and specialisation: Would we be able to find the indicators to measure the degree of specialisation required in each of the areas proposed by Miles (2012): technological KIBS, professional KIBS, and creative KIBS? Would there be any other area of specialisation, beyond these three? Specialisation is measured in expertise. Would a social knowledge aspect be necessary to generate long-term relationships with customers and suppliers and facilitate horizontal integration? On the other hand, might there be a correlation between the salary level and the degree of specialisation of the human capital and could the perceived qualification be analysed in this way?
- Co-creation ratio: Collaboration to address the development of an advanced service requires co-creation “upstream” and “downstream” in the value chain, which seems to be a key to its competitiveness. Would it be useful to analyse the moments of interaction for the horizontal integration of customers and suppliers? Could the degree of complementarity between suppliers and purchasing companies be analysed according to the composition of their internal and external services?
- Added value and competitiveness: For future studies, it may be of interest to include the twofold vision of the client company and the supplier of the advanced service, to analyse the added value offered by the supplier to the client company. Would this improve the competitiveness of its value proposition? How can we measure the degree to which a service contributes to the competitiveness of a customer?
- Knowledge System: At this point, it might be interesting to extend the investigation regarding the roles played by advanced services companies in knowledge systems. To what extent does the advanced services company promote and generate relevant knowledge in the sector? Or is it a mere beneficiary of the results of research of the science and technology system?

From a holistic point of view, another issue to be addressed in the future is the need to find tools and models that help us to modulate the degree to which these five conditions have to be satisfied for a service to be considered as “advanced”.

It is clear that there is still a long way to go to resolve the unknowns that still underlie the fabric of advanced services.

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J2: Service processes

Chair: Shuki Dror

Competence Screening: Introducing a Concept for Competence Management in Service Divisions

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In this paper, a concept for competence analysis and management in service divisions called “Competence Screening” is introduced. This concept illustrates the competences required for providing specific services. Competence screening enables enterprises to optimize competence planning and development in service divisions, and identify inefficiencies and shortages. Enterprises are able to structure and plan personnel and competences in order to provide efficient, high quality services. This paper presents the concept and application in a specific case.

1. Introduction

Services play an increasingly important role and evolve as the most profitable business division within industrial enterprises. Based on service-dominant logic, services are the major basis for economic exchange and the source of competitive advantage (Lusch and Vargo, 2014, Lusch and Vargo, 2012).

The basis for competitive service provision is operant resources and dynamic capabilities (Lusch 2011). Enterprises that offer services need to handle rising operating costs and increasingly complex services. When assigning personnel, idle time needs to be avoided, while at the same time specific tasks require specialized personnel. Due to demographic trends, the capabilities of the current employees change. A major challenge for service provision is to appropriately and efficiently employ and utilize the resources necessary for service provision (Ballantyne and Varey, 2008).

In order to ensure efficient and high-quality service provision, resources need to be analyzed and optimized according to the specific requirements of service provision (Lusch 2011, Ballantyne and Varey, 2008). Personnel need to be allocated to specific tasks or assigned to teams depending on their individual competences and service requirements. Shortages and oversupply of specific capacities need to be identified in order to decide on training, rotation and employment measures without delay.

Effective and efficient competence management in service divisions requires detailed analyses of demands on personnel and competences. Building on service design, the necessary processes and requirements for fulfilling specific services need to be analyzed (Mager, 2009, Evenson, 2008). Methods for service process analyses are service blueprinting (Shostack, 1982) and process chain network (Sampson, 2012). These methods order tasks according to the degree of interaction with the customer or according to the degree of process control. Existing approaches to visualize service processes do not take into account competence requirements and allocation.

This calls for a concept that introduces competences into process and task analyses. Compared to existing methods, this concept needs to support the allocation of personnel so that individual competences and abilities fit the requirements of the tasks. The concept furthermore needs to reveal competence shortages and oversupply so that necessary personnel rotation, training measures, and employment decisions are made.

This is possible with the “Competence Screening” concept that enables effective and efficient competence management in service divisions. Based on competence screening, individual competences are managed, allocated and developed to ensure timely, high quality and efficient service provision. The concept reveals competence shortages and oversupply and supports planning and managing personnel rotation, training measures and recruitment.

In this paper, the competence screening concept is introduced. The paper is structured as follows. Chapter 2 describes and illustrates the concept. In chapter 3, the concept is applied to a specific case. The paper closes with a conclusion in chapter 4.

2. The Competence Screening concept

The competence screening concept is developed by drawing on existing frameworks such as service blueprinting. Existing approaches are developed further to analyze requirements for competence management in service divisions. Competence screening visualizes processes or tasks and the corresponding competences in a Competence Screen.

A competence screen can be developed within five steps. First, each step of a service process is visualized by using the service blueprinting concept. Within the process, single steps are combined to form activities that cannot be performed separately. This implies that these steps need to be fulfilled by a single employee.

Then, competences and competence clusters necessary for performing the single steps are identified. Fourth, each activity is assigned the relevant competences. In this part, the visualized processes or steps are complemented by competences to set up the competence screen. Finally, the competence screen is completed by integrating demographic requirements for each activity. Each of the five steps is explained in detail below.

In order to develop a competence screen, a basic overview of each step of the service process is needed. A reliable method for visualizing processes is service blueprinting as introduced by Shostack (1982). A service blueprint is a two-dimensional picture of the service process (Fließ and Kleinaltenkamp, 2004). All steps of a specific service process are presented in chronological order on the horizontal axis. The single steps are assigned to different parties involved in the service process on the vertical axis. Five key areas can be identified here. These are usually divided into customer actions, onstage actions, backstage actions, support processes, and physical evidence (Bitner et al., 2008). Process steps are depicted as boxes. The service blueprinting concept is illustrated in figure 1.

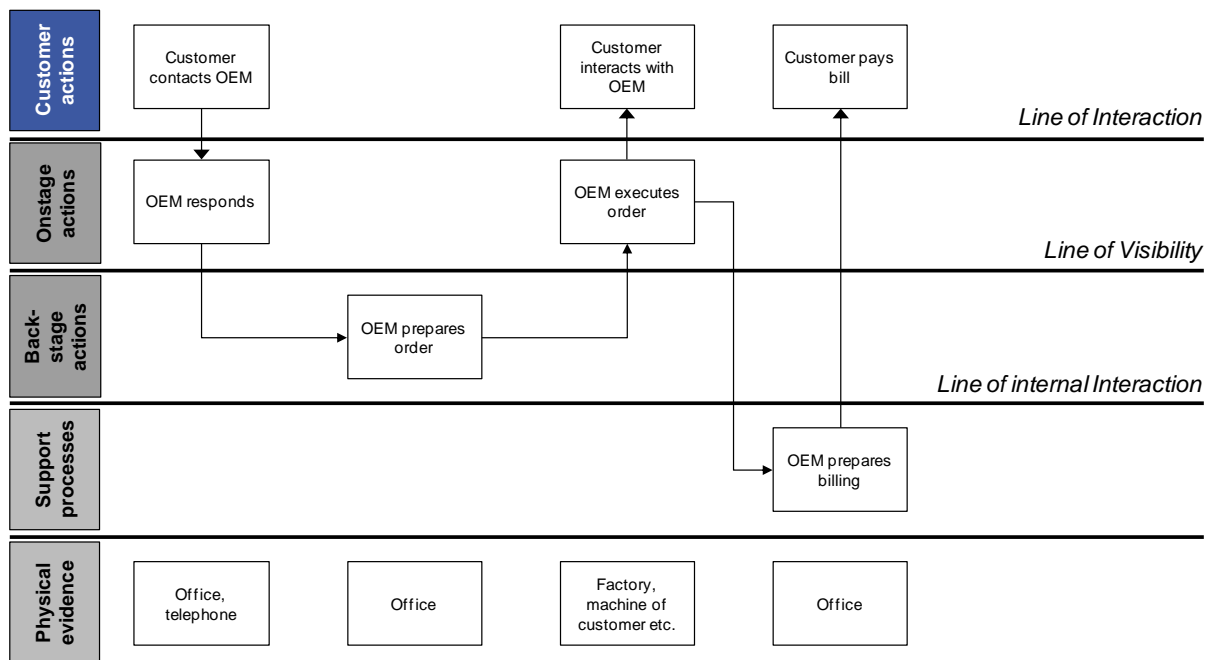


Figure 1: Illustration of the service blueprinting concept

The service blueprint shown in figure 1 describes a generalized customer order. Different process steps are allocated to the five layers described above. The process usually starts with a customer action. The customer contacts the company, e.g. via phone or email. The call service team communicates with the customer and takes the order. After that, the order is planned and executed. Finally, a bill is sent to the customer. The bottom line represents the physical evidence involved in the process. Then developing a competence screen, this line is neglected, as it is not relevant for employee competences.

After deriving the service blueprint, the individual process steps are analyzed and aggregated. The aggregation follows the interaction with customers or other departments within the company, and the function within the service process. These aspects imply that the single steps cannot be separated and performed by more than one person. These aggregated bundles of steps are called activities. In the example above, four activities can be identified. These are call service activities, order preparation, order execution, and billing. With this step, the illustration differs from the service blueprint as a new chart is set up. The sequence of activities is drawn on the top horizontal axis.

The third step is to identify required competences within the service process and define different competence layers. Heyse and Erpenbeck (2009) give a solid overview of employee competences. They define four general competence areas. These are personal competences, social-communicative competences, activity and implementation expertise, and technical and methodological expertise. Each competence area consists of different competences, summing up to 64 in total. To apply this model to the competence screening concept, suitable competences of each specific service need to be identified. The level of detail can be chosen for each specific case. Depending on the requirements and use case, competence screening involves general or very detailed competences. Within the competence screen, the relevant competences depict the vertical axis and represent the competence layers as horizontal stripes.

Each activity is assigned to the relevant competence layers. In order to further explicate the relevant competences, details are included in the cells in the intersection of activity columns and competence layers. The resulting competence screen illustrates competences required for providing specific services. Relevant competences are further described in the cells within the competence screen.

Finally, demographic requirements can be analyzed and integrated into the competence screen, e.g. a high amount of travelling or heavy work. Figure 2 illustrates an exemplary competence screen.

	Call service	Order preparation	Order execution	Billing
Personal competences			<ul style="list-style-type: none"> _ ability to take responsibility _ ability to work under pressure, time constraints 	
Social-communicative competences	<ul style="list-style-type: none"> _ communication with customer via telephone or email 		<ul style="list-style-type: none"> _ communication with customer during order conduction _ consulting 	
Activity and implementation expertise			<ul style="list-style-type: none"> _ consulting is required if customer has specific questions 	
Technical and methodological expertise		<ul style="list-style-type: none"> _ knowledge about specific machine, equipment etc. 	<ul style="list-style-type: none"> _ fault analysis _ knowledge about specific machine, equipment etc. 	
Demographic requirements			<ul style="list-style-type: none"> _ travelling _ physically challenging work 	

Figure 2: Illustration of the Competence Screening concept

As figure 2 shows, different activities require different competences and face different demographic requirements. Call service requires mainly social- communicative competences, while order execution requires a broad set of different competences, e.g. working under pressure, communication and consulting skills, as well as technical und methodological expertise. This activity also faces demographic requirements due to a lot of travelling and physically demanding tasks.

3. Results

The above introduced competence screening is now presented in two case studies that involve spare part supply and maintenance. Within the case studies, competences for providing entire or parts of services are shown. The competence requirements are compared to the competences available within existing personnel. Deviations of required and available competences are detected. Competence screening supports management and development of competences and processes, and service provision as a whole.

The first example is a spare part supply service. The service blueprint is shown in figure 3. In this example, six parties are identified. These are customer, front-office, back-office, support, preparation, and facility-level.

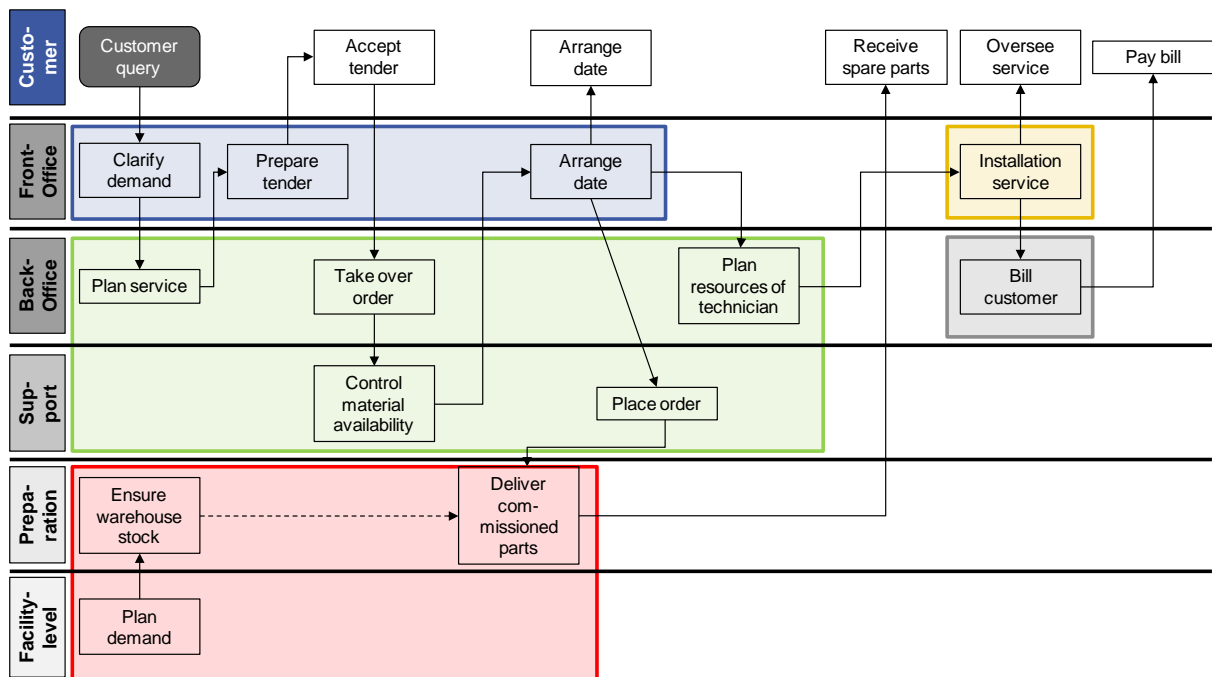


Figure 3: Service Blueprint of a spare part supply

The spare parts supply process starts with a query of the customer, which has to be clarified and planned. Next, the customer is provided with a tender. After the tender is accepted by the customer, the back office continues in processing the order. The next step is material control, which is conducted by the support function. Front office arranges the delivery date, while support places an order for the required spare parts. This is being processed by preparation. This activity ensures warehouse stock and delivers commissioned parts to the customer. After the delivery date is arranged, back office plans resources and assigns technicians to perform installation services. Finally, back office bills the service to the customer.

After blueprinting the process, single steps of the service process are combined to form five activities. Within the spare parts supply process, the activities customer service (blue box), organisation management (green box), warehouse management (red box), field service (yellow box), and billing (grey box) are extracted.

The next step is to identify relevant areas of competences that are necessary to perform the activities. Competences of the customer service are expert knowledge about machines and spare parts. Consulting is required if customers are not sure about their demand, and communication skills are needed to record calls and correspond with the customers. Organisation management is a support function to organize processes. This requires expert knowledge about resource planning software, machines and spare parts.

Warehouse management is a support function to ensure the provision of spare parts. Expert knowledge is required in this area. Field service requires a wider spectrum of competences. This activity requires expert knowledge about machines and spare parts, repairing know-how, consulting expertise, communication skills, and fault analyses knowledge. Perspective transfer is required to perceive the problem and respond flexibly and quickly to new and unforeseen circumstances. The competence screen is shown in figure 4.

	Customer Service	Organization Management	Warehouse Management	Field Service
Expert knowledge	_ machines and spare parts	_ resource planning software, machines and spare parts	_ purchasing processes	_ machines and spare parts _ repair
Consulting	_ if customer is not sure about demand			_ machines and parts
Communication	_ communication via phone and email			_ with customer on site
Fault analysis				_ ability to identify faults on site
Perspective transfer	_ general understanding			_ handle new and unforeseen problems

Figure 4: Competence Screen of a spare part supply

The developed competence screen of a spare part supply service enables management to plan personnel measures.

The second example is a maintenance service caused by a machine malfunction. The service blueprint is shown in figure 5.

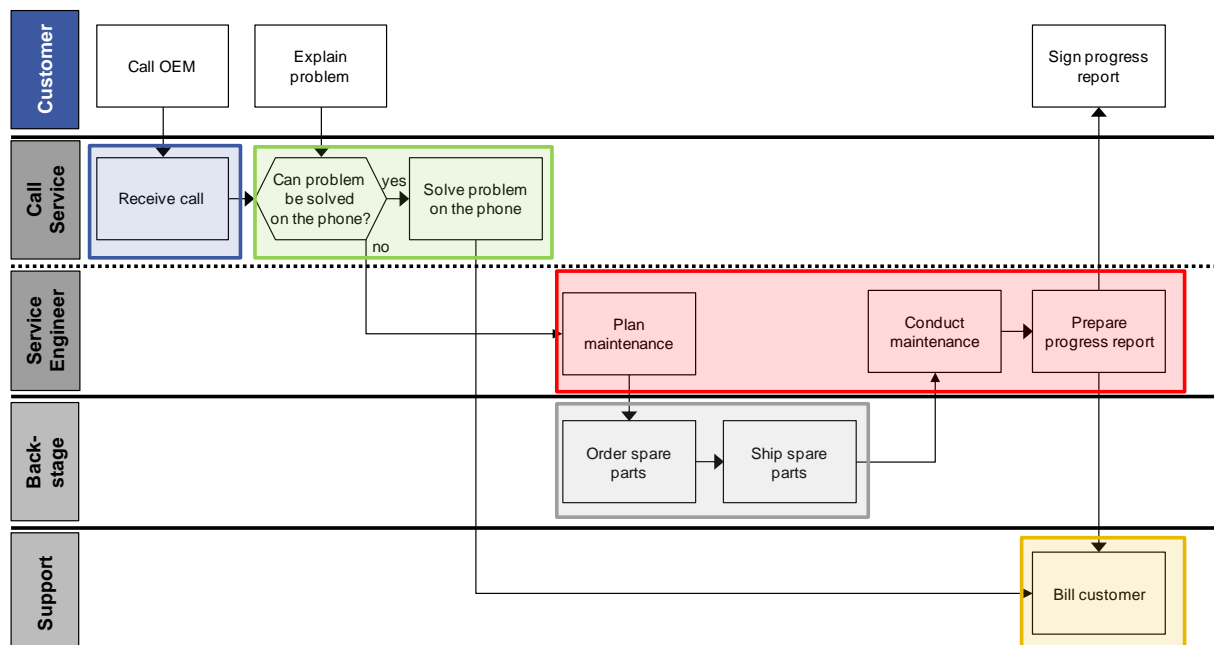


Figure 5: Service blueprint of a maintenance service

The process starts with a customer calling the company due to a machine malfunction. Call service receives the call and connects the customer to indoor service. Indoor service lets the customer explain the problem and then tries to solve the problem via telephone, e.g. with the help of remote maintenance. If the problem cannot be solved via telephone, a service engineer is ordered to plan maintenance. If needed, spare parts are ordered from warehouse and delivered. The service engineer performs the task on site at the customer's. Afterwards, the engineer prepares a report which is signed by the customer. Accounting then bills the customer.

Based on the service blueprint, five activities are identified. In figure 5, the coloured boxes represent the five activities. These are call service (blue), indoor service (green), spare parts provision (grey), field service (red), and finally billing (yellow). Required competences are identified for each activity and the competence screen is developed. The competence screen is shown in figure 6.

	Call Service	Indoor Service	Spare Parts	Field Service
Expert knowledge		_ specific machines _ remote maintenance		_ specific machines
Maintenance				_ ability to execute maintenance properly
Consulting		_ address specific questions		_ achieve long-term improvement
Communication	_ with customer via phone or email	_ ability to ask relevant and precise question		_ communication with customer on site
Fault analysis		_ ability to identify faults via phone		_ ability to identify faults
Perspective transfer		_ general understanding		_ solve unforeseen and new problems _ handle new situations
Self-responsibility		_ take responsibility for decisions		_ take responsibility for decisions and activities
Flexibility	_ constant availability _ react to new situations			_ quick response to customer requirements
Demographic requirements		_ ability to work with remote maintenance software		_ travelling _ physically demanding

Figure 6: Competence Screen of a maintenance service

As figure 6 illustrates, each activity requires different competences. Call service requires solid communication with customers and constant availability. Indoor service, especially when providing remote maintenance services, requires detailed knowledge about machines and the ability to understand the problem and solve it. Employees also need good communication and consulting skills and need to be able to take responsibility for decisions they make.

The provision of spare parts is a support activity that is not considered in this screen - the same with billing. Field service has a broad list of competences which service engineers need to fulfil. This activity requires detailed knowledge about machines and maintenance processes. Soft skills are necessary as these employees are in direct contact with the customer. There are also different demographic requirements that come along with travelling and physically demanding tasks.

4. Conclusion

This paper presents the competence screening concept which illustrates the competences required for providing specific services. This is necessary to optimize competence planning and development in service divisions, and identify inefficiencies and shortages. The approach may e.g. be applied when new services are introduced or existing competences, capacities and processes are evaluated.

The competence screening concept has theoretical and practical implications. The concept draws on service-dominant logic as resources and competences are the major driver of service success. The approach enables the appropriate allocation of resources to ensure efficient and high-quality service provision. Competence screening extends existing literature on service and competence management.

Competence screening is a contribution to management methods, in particular process analysis. It fills a gap that is so far not covered by other approaches like service blueprinting or process chain network. The developed concept contributes to service design literature. By using this concept, services may be designed and optimized taking into account competence requirements and available resources.

For praxis, the presented concept offers the possibility to plan personnel measures effectively and efficiently, and ensure efficient and high-quality service provision. The concept enables solving the current challenges imposed by rising costs, complex services, specialized work force, and demographic changes.

Based on the concept, enterprises are able to structure and plan personnel and competences. Personnel are allocated to specific tasks and processes according to their competences and abilities. Shortages and oversupply, and needs for training, rotation and other employment measures are identified. Competence screening ensures effective and efficient competence management in service divisions.

In order to further develop and prove the concept, competence screening needs to be applied to a wide variety of cases. As individual cases require different competences, competence layers are adjusted accordingly. Applying competence screening in different cases within one single enterprise enables the enterprise to identify their main competences and define a company-specific competence set.

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Berghäll_The concept of commitment in explaining micro-level vitality and innovation of an sdl-network dyad

Abstract

Service dominant logic (Vargo & Lusch, 2004, 2008, 2011 among others) has been a clear line of service science research since its introduction in Journal of Marketing in 2004. A core of the service dominant logic (SDL) is the notion that, in exchange, the service value of the “commodity” defines the value of the exchange relationship to the “customer”. While this exchange can have a monetary value definition, in the actual exchange setting, the actual valuation is done by the individual entering this exchange relationship. While value can be co-created (Gronroos et. al.) as a process, in essence, it is the valuation done by each of the exchange partners separately. Thus, valuation of the “commodity” is a perceptual matter. Further, as value can be derived from very different features of the exchange, the criteria defining the valuation can be very different from what the original producer intended. Thus, for us, the core ingredient and motivation leading the partners to an exchange relationship, i.e. the service relationship, is what we try to understand. We approach the issue from an dyadic perspective in an institutional setting. Vargo (2014) builds an institutional theory framework around the core ideas of SDL. He argues that radical innovations only happen with institutional change. In practice this means that the social system values, roles, role definitions and structures need to change in order to provide a path into new ideas, solutions and innovation. He uses the concept of network vitality to describe the generic capability of the network to enter into in-depth exchange relationships derivative of radical exchanges. Our paper makes an inquiry into this concept of vitality through the concept of commitment (and trust). We argue that the nature of the exchanges is defined by the level of commitment existing in the exchange relationship. Thus, on a very basic level of the dyad, the depth and quality of the exchange is defined by the will and ability of the partners to challenge the “existing” wisdom. While the level of commitment (and trust) can vary between network members, and is even likely to be asymmetric, the vitality of a network is defined, on a micro-level (of the institutional theory) through the level of commitment existing. Thus, we build a basis of micro-level vitality through the concept of commitment and broaden this towards explaining innovation potential of the engagement. This is a work-in-progress paper and was inspired as a response to Vargo’s Key Note presentation in RESER 2014 (Vargo 2014).

1 Service Dominant Logic as an Axiom of Economic Exchange

Service Dominant Logic (SDL), developed by Vargo & Lusch (2004, 2008, 2011, 2014) argues that all exchanges are based on the service value perceived by the partners of the relationship. The value, being a derivative of the perceptual processes of each individual, can thus be very different for each of the parties. While SDL has theoretical outcomes, it is more axiom-like a concept in that it is a basic assumption of economic exchanges (service value) dominates the exchange. Thus, the proposition of service being at the core is not necessarily tested (e.g. Hunt, 1991).

Thus, while the perceived service value dominates the exchange relationship the perceptual processes themselves become interesting, and further, the exchanges between the parties. The exchanges create mutual value that has caused some scholars to use the term value co-creation (e.g. Vargo & Lusch, 2008; Gronroos, 2009). Our interest here is to build a theoretical model on how the dyad-level exchanges could be described as resulting in higher level outcomes of network vitality and network innovativeness. We do this by combining the SDL ideas with the concepts of Trust & Commitment and the notion of expert knowledge.

2 Three Institutional Layers

Institutional theory (e.g. Scott, 2004) divides the spheres of institutions into three layers. These are the macro-level, the meso-level and the micro-level layers. Vargo used the institutional structure to broaden the SDL into networks, and aggregate-level models of societal actions (Vargo, 2014). At the same time he discussed network vitality as an important concept in describing service exchanges. Our response here is to describe the micro-level (Vargo, 2014) exchanges with the classical KMV-model (Morgan & Hunt, 1994) ideas, and further supplement these ideas with some social psychological views of relationship engagements (Rusbult, 1980, Bui et al. 1999, Berghäll, 2002 & 2003). In our case micro-level could be described as the simplest level of a network – a dyad. The meso-level would then consist of the network of dyads, while the macro-level would be described as the network of networks.

3 Micro Level Exchanges – Commitment and Trust

What ties people into relationships? How strong are such relationships? What constitutes the basis of long-term orientation in a relationship, and what are the outcomes of close interpersonal engagement? The concept of commitment in business exchanges generally refers to a phenomenon in which one side of a social interaction voluntarily restricts one's behavioural alternatives due to the presence of a *long-term orientation*. Committed partners are willing to *invest* in valuable assets specific to an exchange (Anderson and Weitz, 1992; Gundlach, Achrol and Mentzer, 1995). Commitment is essential for successful long-term relationships (Gundlach, Achrol and Mentzer, 1995), and is also of critical importance regarding network operations (Anderson, Håkansson, Johanson, 1994, p.7). Furthermore, similar to the concept of trust, commitment has also been found to exist on significantly different “levels” in individuals with a relational orientation, compared to those with a transactional orientation (e.g. Gabarino, Johnson, 1999, p. 81). Therefore, as commitment implies a willingness to make short-term sacrifices to realise long-term benefits (Dwyer, Shurr, and Oh 1987), commitment is also viewed as being central to successful relational exchanges (Morgan and Hunt, 1994).

Alongside these disciplinary discussions, which are also present in Social Psychology, commitment has been a similar focus of inquiry. Based on the Kelley and Thibaut (1978) ideas of interdependence, and the Rusbult (1979, 1980, 1983) views of relationship commitment, later work has come to argue that *“commitment reliably promotes pro-relationship motivation and behaviour”* (Wieselquist, Rusbult, Foster and Agnew, 1999). Commitment is thereby associated with *“a) disparagement of alternatives... b) willingness to sacrifice... c) accommodative behaviour”* (Agnew, Rusbult, van Lange and Langston, 1998). This work also states that a partner in a *“committed couple can be described as a person a) who has a strong personal intention to continue the relationship b) feels attached... c) feels...obligated... d) imagines... long-term future... e) places primacy in... relationship... f) has overcome challenges... g) has poor alternatives... h) has many tangible and intangible resources that would be lost if the relationship were to*

end...and... i) confronts difficulties in ending (or strong social pressure to continue) a relationship" (Arriaga and Agnew, 2001). Commitment is also seen as determinant of the higher-order concept of relationship quality (Fletcher, Simpson and Thomas, 2000). Thus, it seems fair to argue that commitment is often seen as a key explanatory feature of interpersonal relational experiences. These experiences occur on the level of subjective experiences (i.e. perceptions; Lewin, 1935), and are by structural nature implied from Rusbult's (1983, p. 102) observations concerning *"the tendency to maintain a relationship and to feel psychologically attached to it"*. Lydon, Pierce and O'Regan (1997, p. 105) tend to model commitment as two-dimensional, and label *"the positive attitude or satisfaction dimension of commitment"* as Enthusiastic Commitment, and the *"feeling one ought to continue a relationship"* as Moral Commitment. Thus, it seems that relationships might be explainable using the concept of commitment.

The Antecedents of the Model

Drawing from the KMV-model (Morgan and Hunt, 1994), the Investment Model (Rusbult, 1980, 1983), the two-dimensional views of Relationship Commitment (Lydon, Pierce, O'Regan, 1996) and the classic views of the structure of perceptions (Lewin, 1935), symbolic interactionism (Mead, 1934), and the ideas of Marketing as Exchange (Bagozzi, 1975a) it is summarily proposed that relationship perceptions are two-dimensional and consist of the holistic evaluations of the relationship, which happen on the perceptual levels of emotion and conscious calculation. As both of the mediating dimensions of Relationship perceptions seem to be based on some type of holistic impressions, the emotional layering of relationship evaluation in particular should be based on very general feelings or impressions of the relationships. It is thereby proposed that the Rusbult (1980) Investment model of the concepts of Psychological Rewards and Costs could adequately represent such evaluations. According to this model, *"Cost"* is defined as the psychological burden, anxiety and distress-causing elements of relational engagement, while the psychological rewards consist of the positive feedback and gratifying subjective experiences felt by a person.

On the calculative level, Relationship Benefits (from the Morgan and Hunt, 1994), Relationship Costs, Relationship Alternatives (from Rusbult, 1980), Relationship Investments (again from Rusbult, 1980), and Relationship Termination Costs all represent the cognitive evaluations of relational engagement. As in a business setting, where the *"monetary"* calculations hold centre stage in motivating the involvement, it is also argued that the core of the calculative antecedent consists of the computation of relationship *"monetary"* benefits against the liabilities of relationship (monetary) costs. Here, the Morgan and Hunt (1994) concept of relationship benefits must overlap onto positive monetary evaluations. Simultaneously, the concept of Relationship Investments (from Rusbult, 1980) must overlap with the relationship exit inhibitors mentioned in the Morgan and Hunt (1994) concept of Relationship Termination Costs. This would leave the exogenous constructs of the relationship conscious sphere as those of Perceived Economic Benefits, Investments and Alternatives.

The Outcomes of the Two-layer Mediating Structure

In considering the one concept of Rusbult's model (1983), Relationship Stability, this seems to coincide semantically with the Propensity to Leave concept of the Morgan & Hunt (1994) model. However, here we

are faced however with some striking differences considering the relationships. First, the Rusbult model deals primarily with romantic involvement. In romantic involvement's, it is natural to assume that the decision to leave is indeed a very grave one. Contrary to this, business relationships are seldom exclusive, and even when they are exclusive they nonetheless deal with issues that are less- involving for the relational parties. Second, the level at which the relational partners consider the matters must be very different. One can assume that while the business relationships are analysed on a cognitive level, the romantic involvement, by definition, happens on a emotional level. Third, with the emotional complexity of romantic involvement, the "stay/leave decision" must reflect a vast multitude of psychological material that is involved in the decision-making process. So while Relationship Marketing theorists can distinguish between certain outcomes of relational interaction, these are likely to be less complex by their psychological nature, and shallower in terms of involvement than are the romantic involvement situations. As such, all of Morgan & Hunt's (1994) concepts might be assumed to be captured in the Rusbult (1980) concept of Relationship Stability. Thus it is proposed that the core outcome, or behavioural intent, of the model is the "length" of the long-term orientation. As this evaluation happens on the conscious level it also is a cognitive outcome. However, as Morgan and Hunt (1994) argue the emotional outcome could consist of functional conflict and uncertainty. Thus, this outcome could be a measure of emotional security, or trust, felt by the dyad member.

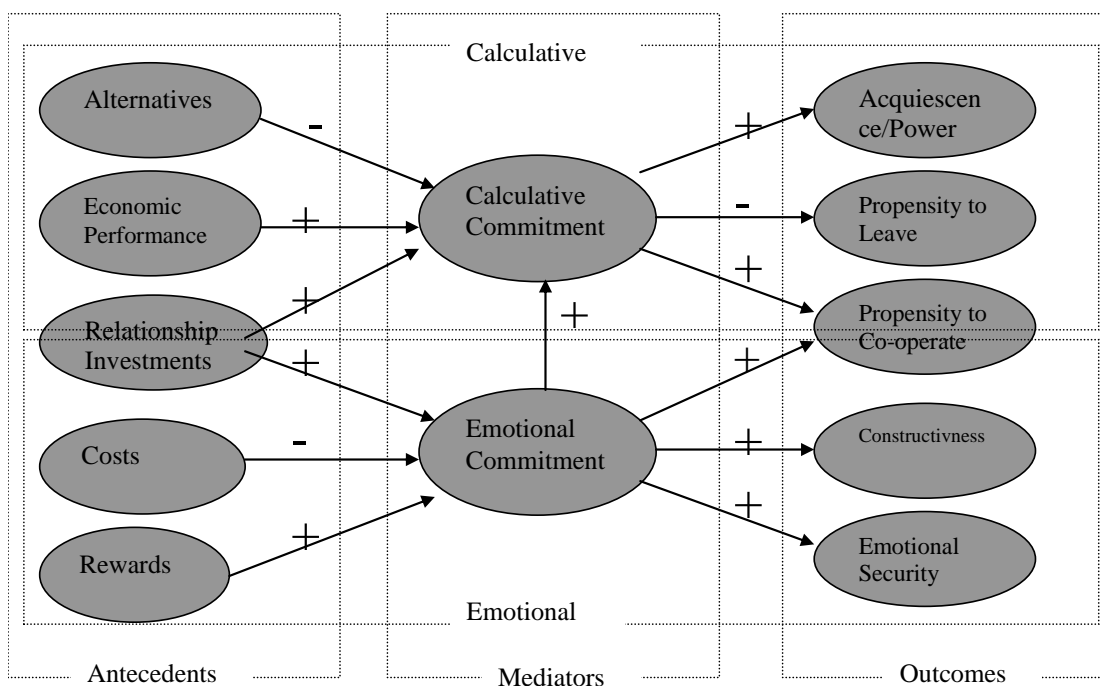


Figure 1: Relational model of Socio-Economic Exchanges (Berghäll, 2002, 2003)

While these issues describe the functioning of the relationship the "service" itself can be more complex. To tackle this complexity the concept of expert knowledge is tackled next.

4 The Concept of Expertise

Pedagogical studies have always been interested in how expertise is formed. A social psychological study on mushroom collectors (Fine and Holyfield, 1996) argues that those people whose understanding on the subject (here mushrooms) had more layers and was deeper by each layer, where seen by other members of

the group as experts. While the previous seems intuitively plausible, the definition doesn't escape the social boundaries by which it is tied to.

To understand expertise, it is vital to understand what expert knowledge is and how it comes about. According to Bereiter and Scardamalia (1993, 43) expert knowledge is the only an essential factor of expertise, but it does not make anyone an expert as such. Expert knowledge should not be seen too narrowly, because it, first of all, contains a number of concepts grouped under the terms of formal knowledge and skills. These two forms of knowledge can fairly easily be verified. But the third form of expert knowledge, hidden or tacit knowledge, is not that easy to be seen or pointed out. Nevertheless, Bereiter and Scardamalia (1993, 46) state that this kind of knowledge most profoundly distinguishes experts from non-experts. So, while Shipp et. al (1993) define a skill as "*...a developed ability that can be refined through practise and typically is constituted of potential, aptitude, motivation, style, knowledge, experience, and reflective evaluation*" the expert knowledge seems to have an operational or pragmatic dimension to it.

Bereiter and Scardamalia (1993, 47) list three forms of hidden knowledge that have a major role in expertise: *informal knowledge, impressionistic knowledge and self-regulatory knowledge*. *Informal knowledge* is quite close to some kind of common sense that an expert has over his or her area of expertise. It has been affected by informal knowledge. *Impressionistic knowledge* takes also feelings into account, because in some situations, feelings are an essential and inseparable part of expert knowledge. *Impressionistic knowledge* forms basis for an expert's practical and theoretical judgements. *Self-regulative knowledge* is self-knowledge relevant to performance in some certain domain. It is knowledge that works well for a certain expert, but it does not necessarily work for any other experts.

Referring to several analysis (Bereiter & Scardamalia, 1993; Eraut, 1994; Eteläpelto & Light, 1999), Tynjälä (1999, 359) states that expert knowledge can be seen as a combination of three different components: 1) formal knowledge (declarative knowledge), 2) practical knowledge (procedural knowledge) and 3) self-regulative knowledge.

Formal knowledge can be loosely described as the knowledge that is found in textbooks (Bereiter & Scardamalia 1993, 62). Formal knowledge forms the basis of expertise. The knowledge can be both very concrete and abstract or theoretical knowledge of some area. (Tynjälä 2002, 171) Practical knowledge is acquired and developed in practise i.e. in practical situations where a certain expertise is needed. Practical knowledge is contextual and social in its nature and it can be mentally conscious or subconscious. Tacit knowledge or expert's hidden knowledge are examples of this kind of knowledge. Also an expert's skills can be considered as a form of an expert's practical knowledge. (Katajavuori 2005, 17-18; Bereiter & Scardamalia 1993, 47). According to Tynjälä (2002, 171-172), an expert's self-regulative knowledge is related to the conscious and critical evaluation of one's own performance. If Ackerman et al. (2003) define critical thinking as a person's ability to "*...use information to identify, analyse, and draw conclusions...*", the self-reflective critical skills are by definition meta-cognitive skills. Thus, we arrive at the concept of meta-cognitive skills.

Meta-cognitive skills can be described as conscious evaluation of one's cognitive functions, such as thinking and learning. These skills make us aware of our know-how and its limitations, and thus they enable us to improve our performance (Katajavuori, 2005, 18). The key to professional development is to make the hidden knowledge visible, which paves the way for critical reflection and transformation (Tynjälä 1999, 361). Therefore one can say that expert knowledge is dynamic. It is not something that one could simply achieve

and possess, but it also includes action – doing and learning. According to Bereiter and Scardamalia (1993, 66), “*formal knowledge is converted into skill by being used to solve problems of procedure*”. And respectively, “*formal knowledge is converted into informal knowledge by being used to solve problems of understanding*”. This, thus explains while a lot of scholarly research is interested in the issues of experiential learning (see for instance: Smith and Doren, 2004).

So as already argued, expertise can also be seen as a communal or societal level phenomenon (Bereiter & Scardamalia 1993, 246). When the societal and communal dimensions of expertise are emphasised, then the know-how will be emphasised as consisting of the social and networking skills of an individual (Tynjälä al. 2004, 92). So while the social context of the learning is important, as in the case of the mushroom collectors (Fine and Holyfield (1996), the structure and the operational readiness of the knowledge are also critical definers of expert knowledge. Thus, one could argue that while context-specificity in learning produces context specific knowledge, the experiential (or emotional) nature of the context of learning produces something that escapes the context-specificity.

Figure 2: Two imaginary experts with their own definition of their surroundings and the problem at hand.

In line with relational concepts and the social psychological views of commitment, we see, that the micro-level drivers of network vitality (or close relational exchanges) are an outcome of the relationship motivational factors (the antecedents) and the related outcome (the outcomes). Thus, what we call the propensity to engage in relational exchanges is what we have labeled as *Vitality Potential* (Vit.Pot.) of each partner. The following describes the concepts in more detail.

In a dyadic setting each of the parties can have (and are likely to have... in line with the logic of SDL), their own perceptions of the value received and created. In line with Morgan & Hunt (1994) one would expect the relationship for each of the engagement to be reflected in the levels of Acquiescence, Propensity to leave (low), Co-operation, functionality of conflicts, and felt security (low un-security). Higher level of each would present the partner in the dyad with a higher propensity to engage in close and deep relational exchanges. Thus, one could call the outcomes of KMV-model (Morgan & Hunt, 1994) as being descriptors of dyad-level potential of network vitality. Similarly, in line with the Social Psychological views of commitment, Security, propensity to leave, and propensity to co-operate, will be the outcomes that need to be high in order for the dyad to function.

Further, as the previous vitality potential is different for each of the partners the total vitality potential should be some sort of a sum of the two vitality potentials (potential of A + potential of B = total vitality potential). However, as these potentials are a direct outcome of the antecedents of the relational models the outcomes are likely to also derived by the model antecedents. We therefore call, the antecedents as motivational factors of the engagement. Thus, the concepts of perceived benefits, perceived alternatives, perceived costs and rewards, opportunism are likely to condition the level that the vitality potential can reach. Vitality is likely to be high if motivational factors are high resulting in high levels of the outcome variables, and vice versa. (morgan & Hunt, 1994; Berghäll, 2002).

While the present concepts described the relationship functioning we combined these ideas with the concepts of expert knowledge.

6 Vitality and Expert Exchanges as Predictors of Innovative Activities

In line with the previous section of expert knowledge, in a dyadic setting, the exchange setting is described by two different perceptual maps of the challenges at hand. The elements of the challenge and the depth of processing of the "issue at hand" is likely to be different between the dyad partners. However, the more similar the perceptual maps are, the easier it is for each of the partners to negotiate a mutually satisfying solution. Also, the more vitality potential there is the more likely it is that the partners are willing to challenge each other and let the other one challenge oneself (e.g. high levels of cooperation, functional conflict, and security). Thus, while similar perceptual maps present an easier prospect for the social negotiation setting, it also easily leads to non-radical outcomes. This is because the sphere of possible outcomes will be reduced. Similarly, different perceptual conceptualizations lead to more challenging outcomes. Further, the more advanced or "state-of-the-art" the perceptual definitions of the exchange setting is in the minds of each of the actors the more likely one is to advance towards new radical innovations. However, the last is subject to the previously mentioned motivational factors but also to the cultural and organizational norms being free enough to let the innovation activity take place (or limiting the outcomes to already accepted operational modes of activity). By the last we mean that if the mandate of the partner entering the exchange setting is strictly tied to predefined outcomes (for instance when business exchanges are directed by a rigid strategy execution), the radical innovations are un-likely to occur. On the level of radical innovations, especially the concepts of Co-operation, Functional conflict and Security of the relationship seem to describe setting where the existing knowledge can be challenged.

On the base of the previous the following diagram presents the logic of the model of micro-level network vitality and innovation potential.

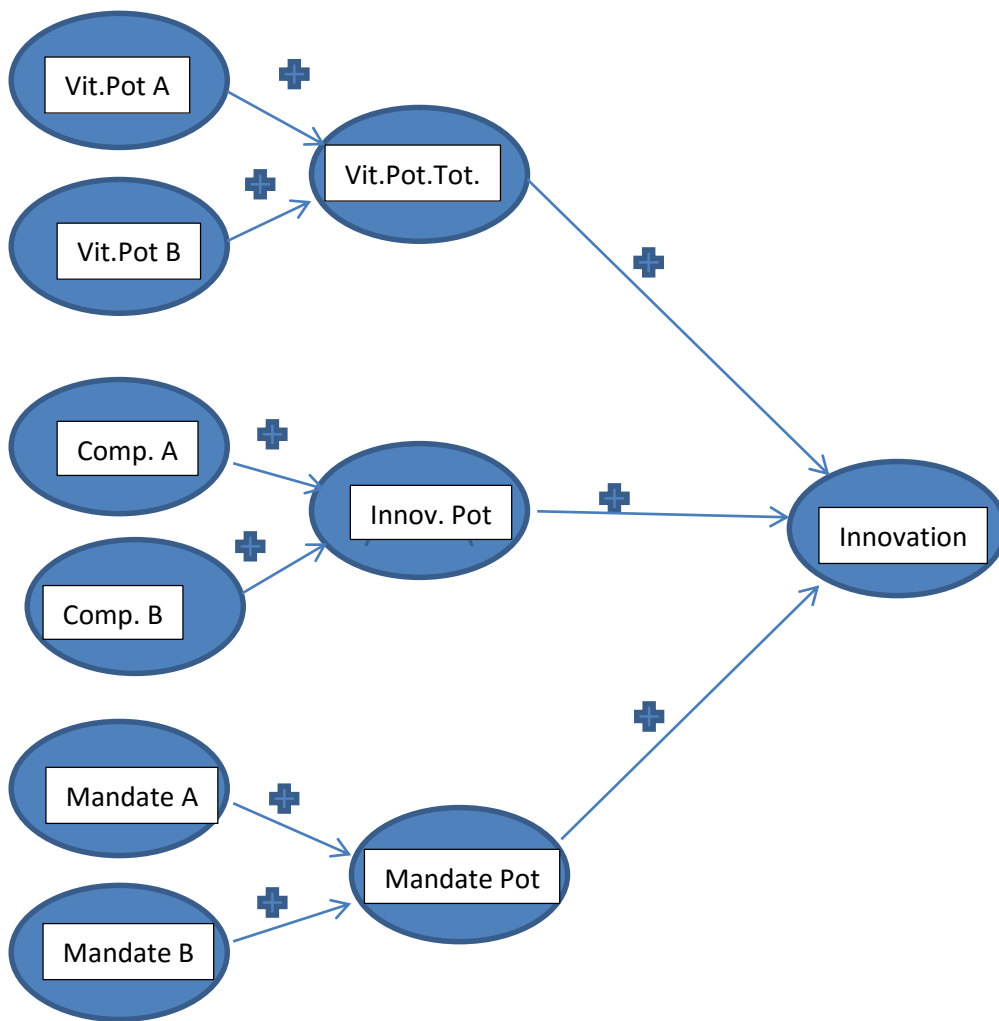


Figure X: The model of Relationship Innovation Propensity (RIP)

As already mentioned the sum of Innovation Potentials result in the total Innovation potential of the dyad ($\text{Inno.Pot A} + \text{Inno.PotB} = \text{Total.Vitality.Pot.}$). Further, the complexity of processing for actor A + complexity of actor B result in Innovation potential ($\text{Comp.A} + \text{Comp.B} = \text{Innov.Pot.}$). Last, the organizational cultural and managerial limitation provide each actor with a freedom of movement in the relational dyad, thus resulting in a threshold of the possible innovation outcome ($\text{Mandate A} + \text{Madate B} = \text{Mandate Potential}$). The figure above present s the ideas developed so far. The Pluses represent the hypothesis of the effect directions. As cab ne seen there are seven direct effects. Thus the hypotheses are as follows:

1. The higher the vitality potential of actor A the more likely the total vitality potential of the dyad is likely to be.
2. The higher the vitality potential of actor B the more likely the total vitality potential of the dyad is likely to be.

3. A higher complexity of processing for actor A leads to a higher potential for innovative outcomes for the dyad.
4. A higher complexity of processing for actor B leads to a higher potential for innovative outcomes for the dyad.
5. The higher is the total vitality potential of the dyad the more likely it is to result in innovations.
6. The higher is the total innovation potential of the dyad the more likely it is to result in innovations.
7. The higher is the mandate given to actor A, the more likely the dyadic exchange is lead to innovation.
8. The higher is the mandate given to actor B, the more likely it the dyadic exchange is lead to innovation.

7 Discussion and Conclusions

This paper discussed the concept of network vitality (Vargo 2014) through the concepts of relationship commitment (trust) and complexity of the relational exchanges (expert exchanges) in a dyadic setting. It built a model of vitality through the concept of vitality potential of each dyad partner separately. Through the concepts of Acquiescence, Propensity to Leave, Co-operation, Functional Conflict, and Security on got a view into the possibility of disproportionate propensities to engage into close exchanges, but also a view into why (motivational factors lacking) few engagements result in highly challenging mutual exchanges. Further, the similarity of the expert knowledge is likely to ease or complicate the exchange setting but also is a predictor of how radical the outcomes from the engagement might be. This last observation describes why organizations striving for tight strategy related managerial steering could also be limiting innovation activities to incremental outcomes. Further, the organizational culture might act as a similar hindrance of innovation through the mandate it provides with different layers of employees. Concluding, one can say, that even though the work is still in its early phases the model can have some interesting and broad outcomes. The key critic here of course being the measurement of such complex issues especially if striving for a confirmatory setting.

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J3: New service values - New service concepts

Chair: Claire Forder

Enhancing the service value proposition in tradition to transformative service research

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Service value proposition is in the topics of many researches recently. In the context of transformative service research, the framework for evaluation of service value proposition impact on the customer's wellbeing is prepared. Since transformative service research demands covering long-term period and multidimensional evaluation of wellbeing – major points of aspects of wellbeing are discussed here, in the paper. The customer's perspective, as main value co-creator and determiner, is analysed in wider meaning, as of any entity could be engaged: individual, community or a part of a society.

Introduction

Transformative service research (TSR) is related to the platform of service researches empathizing the well-being of individuals (they could be customers and providers) and communities (family, society). Services are perceived no longer as a final product, but as engine for societal transformations (Sangiorgi, 2011). The service production and consumption continues to grow (Gallouj et al., 2015), together with larger employment in this part of the economy and stimulated attention from policy makers, businesspersons, as well as scientists. The traditional service research discovers the impact of service, service quality on consuming, satisfaction of a customer, his/her loyalty (Rosenbaum et al., 2011; Rosenbaum, 2015).

TSR examines positive and negative affect (Davis, Pechmann, 2013) of service consuming on the well-being of different entities: individuals, collectives, and ecosystem (Mick et al., 2012; Anderson et al., 2013), giving the focus on long-term impact, as mentioned already. TSR uses the wider approach to consuming of any service, emphasizing the need to supply more (in value for any concerned part) for less (attempt, costs, resources used, etc.); emphasizing the benefit both for consumers and service entities (Davis, Pechmann, 2013).

Among strategic services research priorities – TSR has already been distinguished for several years (Ostrom et al., 2010; Anderson et al., 2013; Ostrom et al., 2015; Sweeney et al., 2015). Many other strategic research priorities are developed, too: measuring and optimizing service outcomes, understanding the service value in the global context, enhancing the positive outcomes in services, giving ideas how to improve customers' wellbeing by consuming the services (Mende, Doorn, 2014), etc. Research questions for discovering the transformative impact on well-being arise – such as how to improve the wellbeing, how to reduce negative impact of the consuming, and what service value proposition is significant, etc. Ostrom et al. (2015) present the framework for services research priorities in 2015, where many dependence relations among strategic priorities, design priorities, value creation priorities and out-

come priorities are developed. Our literature review showed scarce attempts in developing impact on wellbeing of the service customers of service value propositions construct. Service providers change their service value propositions in order to gain competitive advantage (Kowalkowski, 2011) but seldom take care on what influence on final customers is really made before, during and after purchasing these services.

The aim of the paper is to develop a framework for discovering the impact of service value proposition on wellbeing of service customers, all within the conceptual context of transformative service research.

Methodology of the research. Scientific literature analysis on service value proposition, its constructs and logics are revealed. The paper presents a conceptual analysis of service value propositions from transformative services research perspective. A six-step process of service value proposition builder is interlinked to the service customer and his/her perception of wellbeing from different wellbeing perspectives.

Theoretical results: the conceptual framework, what can be used as tool for identifying, measuring and optimizing (or/and improving) the service value proposition for customers' wellbeing, is expected.

The managerial implications cover guidelines for the service researches, which perform researches in the tradition to transformative service research, highlighting the necessity to improve the wellbeing of different entities through the service, as framework will serve as a tool for further transformative and customer researches, too. The insights for service providers in the transformative services industry, with conceptual path in identifying, measuring the service value proposition, identifying the gaps between service value proposition and customers' value perception, taking the strategic decisions on enhancing the value in order to improve the well-being of service customers, are expected likewise.

1. Service value proposition

The attempts to find the way to deliver the exceptional services value recently are growing. Understanding the customer value, its main dimensions, developing value proposition – all that enable to gain the supplier competitive advantage (Rintamäki et al., 2007). The value is a concept analysed already for longer than two decades; and recently value proposition concept is a key research priority settled by the Marketing Science Institute (Payne, Frow, 2014a); one of among fifteen research priorities in a rapidly changing economy, according to Ostrom et al. (2015). The service value proposition is essential strategy in any commercial service enterprise (Payne, Frow, 2014b) as value creation is the fundamental mission of any business. Measuring and optimizing the value, creating clear path for the customer satisfaction could be one of strategic decisions of any service provider in the high competition market (Ostrom et al, 2010).

In common terms, *service value* is understood as service customer benefits (product, service, and image) for his/her incurred costs: price, costs of acquisition, maintenance and service disposal. Skålén et al. (2015) quote Lanning and Michaels, who described the service value proposition as clear, simple statement of the benefits, tangible and intangible, that supplier will provide, along with the approximate price it

will charge each customer. From customer's perspective, the service value is more personal and holistic expression of the service quality. The mission of service value proposition is to answer the customer why he or she should buy the service from a particular provider, not from another one in service market. Usually this assessment is subjective one, considering positive and negative consequences of the service. From provider's perspective, the service value is expressed through service value proposition, where segmentation, service improvement and communication (Rintamäki et al., 2007) are strategic priorities of the provider. The buying motives of the customer, his/her appreciation of valuables are captured in the service value proposition, too.

Comparing the service value proposition and core service offering, the former precedes the latter (Kowalkowski, 2011). The superior service value, probably, enables the provider to sustain competitive advantage and better financial performance (Payne, Frow, 2014b). Nevertheless, the process of the building the service value proposition is never ending, as rivals can absorb the experience of leaders very quickly. They (rivals) can even overtake them.

The service value generates various valuables for a customer, not only savings and benefits to him or her. Literature analysis findings (Rintamäki et al., 2007; Skålén et al., 2015) reveal such values as: enhancing customer experience, increasing customer retention, improving quality, demonstrating thought leadership, reducing costs or (and) complexity, improving understanding or (and) stability, reducing risk, increasing agility, enlarging competitive differentiation, generating revenue (i.e., for business customers), promoting growth, etc. Customer-oriented focus of the service value proposition underlines long-term orientation, established and effective collaboration between the provider and the customer, experienced staff and value-creation opportunities, internal knowledge and competence as advantage, long-term focus in selection of providers (Kowalkowski, 2011), and so on.

Service value providers do not deliver the value itself, but they create the service value proposition in co-creation with a customer (Kowalkowski, 2011; Frow, Payne, 2011). The service value proposition may be explicit or implicit, including tangible or (and) intangible elements. It should appeal to the strongest drivers for customer's decision-making drivers as the customer can take or refuse the decision about the purchasing the service in any / many stages of purchasing decision-making process.

To understand more clearly the process of service value proposition, dividing to separate stages of service value proposition could be beneficial. Thus, close co-operation with a customer in all stages of value builder is necessary (see Fig. 1):

1. *In the first stage*, specifying the group or customers of the service provider is targeting, which market proposition being created.
2. *In the second one*, shaping the value experience, how customer perceives the relation between benefit and costs for the service, answering what does the market value most.
3. *In the third stage*, choosing the offerings, it is the product and service mix (bundle, package), what service provider actually is selling.

4. *In the fourth one*, defining, which customer needs is provider satisfying, how offering delivers the customer value, what benefits the market will derive from the product or service.
5. *In the fifth stage*, qualifying the alternatives in the market for the customer and in differentiation from and better than alternatives here.
6. *In the last one*, proofing substantiated creditability and believability of service offering, value proposition.

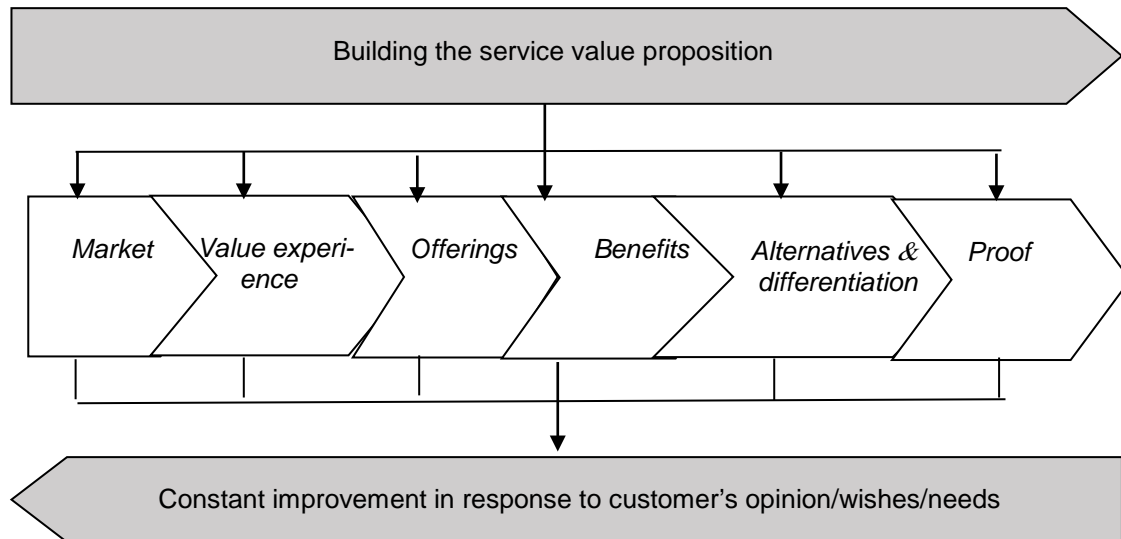


Fig. 1: The builder of service value proposition

The service value proposition is a promise of the value to be delivered and a belief from the customer that value will be expected. The service value proposition is an offering to customers representing a promise of benefits (Payne, Frow, 2014). In addition, the key success of services providers lies not only in offering the value proposition, which, after being approved by customers, enables the mutual co-creation, but in clear anatomy of service value proposition (which parts they consists of) (Skålen et al., 2015). Although recently scientists, services businesspersons recognize the urgency of the value proposition, urgency to co-create with a customer, surprisingly few researches are made on that topic, according to Skålen et al. (2015).

The service value propositions could be one of three kinds, according to Anderson et al. (2014):

- *All benefits*, when suppliers list all benefits they believe they might offer. This orientation to the consumer requires least knowledge about him/her and minimum attempts in working on the service value proposition. There are several drawbacks on that approach. One of them is that a customer might not notice the benefit of a service value proposition at all. Large companies with small level of customization lose control on individualized needs of their potential and current consumers. The second fear is that a consumer might not find difference in the service among many market alternatives.

- *Favourable points of difference*, it is the approach, which recognizes that the customer has alternatives. The service providers can use two-three points for differentiation of their service value from other alternatives. The service might have several points of differences targeting to the specific group of their customers.
- *Resonating focus*, the approach, called by Anderson et al. (2014) as “gold standard”. The suppliers, keeping their strategy on that position, can provide such customer value proposition by choosing their offering on the few of elements to target customers. This type differs from the second (favourable points of difference), as on-two points of difference are delivered, extended to improve and growing the value to target customers. The unnecessary elements (services, products, values) are not provided. This approach lets the supplier to deliver costs savings to the customer.

Service value proposition, acting under the *all benefits* value, should answer the customer why he/she should purchase service from a particular provider. The value proposition of *favourable points of difference* recognizes the outfall that a customer should find the answer, why he/she should buy here instead of a competitor, other alternative. The resonating focus answers the question how market offering delivers the superior value to the customer compared to other best alternatives. Authors (Payne, Frow, 2014a) recently agree that the third approach of the service value proposition is preferable and the most promising. Mass-consuming, oversaturation of the market by products is not glorified anymore.

Other approaches to deliver the service value also exist. To be competitive one and to deliver the superior value – service supplier should engage the customer into the service process (Frow, Payne, 2011). The help of a customer as a co-creator is unappreciated, as he or she both participates in choice, in preparing, in producing, as well as in consuming the service. The customers, doing business with the providers, influence the service performance, as well as service perception, and value. Besides that, the performance benefits and pricing-based benefits, relationship-building value and co-creation value are especially important to the service customer (Payne, Frow, 2014a), as opposite to the value of production items.

Otherwise, one more solution to enhance the service value proposition – is to choose the strategy for development of the business: 1) reduce cost and performance; 2) increase performance and price; or 3) enhance the value without increasing price. The first is traditional one, but competitors also can easily overtake this practice. To increase performance and price is rather risky practise, as the service provider might not be always sure, if he or she wins from that. The customers usually avoid paying more even if they perceived they get larger value from a service. The third strategy for development of the service value seems might bring the largest value for a customer as a price is not going to be larger.

The service value could be by the value it reflects, according to Rintamäki et al. (2007): *economic*, based on price of a service; *functional*, based on specific functional needs; *emotional*, where experiential needs are dominating; *symbolic*, based on self-expression needs. It highly relates to what a customer expects from consumed service: to satisfy their needs cheaply, to solve problems, actualize himself (herself), etc.

The value concept for different stakeholders might be different. Each entity as customer market, referral market, supplier and alliance market, influence market, recruitment market, and internal market (Frow, Payne, 2011) has own point of view to the service value proposition benefit. The S-D logic states that service providers offer value proposition, that value is being co-created during the interaction; however, the customer in the context, not the provider, or other entities, determines it (Skålén et al., 2015). Thus the service value proposition is a promise that a customer and other interested parties will benefit from the service offering, how it is offered, how customers will be involved in the value co-creation/co-production. The paper focuses on service value proposition, upon the customer markets: buyers, intermediates and final consumers. Even if the value for other markets should be estimated, the value for the customer could not be the point of parity – underestimating the value for a customer will destroy the value for other stakeholders, undoubtedly, too. For example, reducing costs for the customer should not increase the damage for environment.

2. Transformative service research

Transformative service research with increasing interest from scientists, businesspersons, society differs from the traditional one in many cases. According to Crockett et al. (2013), problem identification in the transformative service research is associated with significant social problems and multi perspective (in comparison to simplified problem and specialization in the traditional research). Wider data techniques applied, comparing to the traditional; as well as sampling, are flexible and creative, instead of representative, large. The transformative service research emphasizes consequential benefits instead of short-term one. There are many other differences in the transformative service research comparing to the traditional one. Scientists (Anderson et al., 2013; Crockett et al., 2013) emphasize them in order to engage/attract more scientists from different science fields, transdisciplinary teams with broad range of knowledge, expertise and resources, in order to cover multidimensional aspects of our life, in order to increase the individuals, the community's wellbeing.

The urgency of research translation in the traditional research is underestimated, too. After publishing results of any survey, many researchers hope that they have done their best in order to improve individuals' life. However, to be published – results usually are presented for individuals from the same community: scientists, several businesspersons, students, etc. The translation of results to "normal" language, understandable for any representative of our entity is emphasized in the transformative service research only, too. This is possible engaging consumers, policy makers, managers, scientists in sharing information, processing surveys, shaping instrument for the research, etc. Not only academic journals or conferences as communication means should be included, but also social media, networking, the Internet, increasing the wish of any actor to share well practice in enhancing his/her or whatever wellbeing.

The aim of the transformative service research has many qualities, such as highlight sociocultural and situational contexts, disseminating findings to different shareholders (Davis, Pechmann, 2013). The transformative service research seeks better quality of life for present and future generations, according to Zayer et al. (2015). Primary qualities – the improvement of wellbeing and collaborating with the customers – are emphasized. To give the ideas – how to improve consumer's life with one or another

service (Mende, Doorn, 2014) – the second motive might be mentioned. Rosenbaum (2015) emphasizes that the research should focus on creating positive changes and improvement in the wellbeing of individuals. He criticizes that 25 years of traditional service research had no or little benefit on the customers' welfare. Services organizations using segmentation on the ground of the traditional research (Rosenbaum et al, 2011) ignore or even harm the consumer wellbeing as target segments usually include the most profitable customers, forgetting the deprived one. While the traditional service research traditionally focuses on the managerial and marketing issues and profits, the transformative emphasizes the consumer wellbeing, what depends a lot on delivering and designing services, implementing policies, and shaping the service value proposition so that the providers and the customers, as well as any other related shareholders – could benefit.

Unfortunately, the transformative service research successfully ploughs ones way in many disciplines as sociology, psychology, etc., but business researches in the transformative service perspective are still sparse.

Growing attention to the transformative service research opened many untouched fields in the services marketing. One of such is what role of services is played affecting the consumer wellbeing, according to Anderson et al. (2014). The interrelationships among *value creation priorities*, including 1) understanding value creation, and 2) enhancing the service experience – and other priorities in the transformative service research, such as *strategic priorities*, *design and delivery priorities*, and *outcomes priorities* are underlined in 2015 (Ostrom et al, 2015).

Recently scientists try to explore that role, trying to look deeper into the services, which could influence directly or indirectly the wellbeing of many entities, access to services, decrease of disparity, health care, etc. Of course, the service economy, what makes the largest part of any advanced economy, has a large impact on the wellbeing, too. It could be positive, as well as negative one. Blocker et al. (2013) entitled the negative wellbeing as *ill-being*. The traditional service research does not study how to sell services more, but what effect in buying the services could be, and how to improve the wellbeing sense of customer, his/her family, collective before/during or after purchasing, for example, expensive service. The transformative service research challenges researches to undertake studies in fundamental problems and opportunity searching (Crockett et al., 2013). They do not focus on single problem or opportunity for any single entity, such as a particular service provider or a customer. That is why the transformative services researches, which main task is to explore ways in improving the wellbeing, should be applied to services *per se*.

Conceptualizing the transformative service research, the authors (Anderson et al., 2013) stress that a relation between services' entities and consumer wellbeing occurs. Giving the framework for the TRS entities and wellbeing outcomes, the above-mentioned authors displayed that both *services entities*, such as sector, organization, offering, process, employee; and *consumer entities*, such as ecosystem, collectives, and individuals, affect the wellbeing outcomes. The impact could be direct, as employee's impact on the customer wellbeing, or indirect, as offering's impact on ecosystem. Looking deeper, the transformative service research analyses deeper connections, such as between service offerings and individual's wellbeing (Hall et al., 2015). The services touch many fields in our daily life and their effect could be positive and negative. Currently rising attention to sustainable development forces the researchers to investigate what exactly in the service providing systems, separate

processes, value elements have positive or negative outcomes, enhancing the former, minimising the latter.

The service provider cannot manage several effects, such as consumer interaction with service sector (the impact is minimal by a single provider), macro environment influence, etc. However, the service offerings, the processes, the employees could be under control of the service provider. The service providers' offering may have different benefits for the services customer: technical, economic, service, social (Anderson et al., 2014). The question whether *wellbeing* is performed as outcomes of service value proposition – is essential. Traditionally the focus on service outcomes that compose the thought on wellbeing outcomes, such as equity, social justice, human capabilities and development, freedom, happiness is needed, as service consumption influences customer wellbeing, life satisfaction, and perceived quality of life. Sweeney et al. (2015) state that satisfaction with concrete events and experiences spills over life domains, work, leisure, health, family, and entire life satisfaction; thus enhancing the service value proposition for customer may help to improve the wellbeing of most of them.

The transformative services research offers the platform for investigating long-term impact on customer's wellbeing; often not separating from wellbeing of the family, collective. The challenge of TRS is to improve life in current conditions, demands, and potentialities (Crockett et al., 2013) as increasing the production can negatively affect the ecological, social environment, and hereby overall wellbeing.

3. Setting the framework

Although customer-oriented value proposition factors are crucial in defining what aspects should be evaluated, the providers' perspective is usually dominated in building the value proposition. One aspect that is more urgent should be taken into the domain: stakeholders' needs should be as possible as balanced (Frow, Payne, 2011) in order to improve the wellbeing of the customer (directly or indirectly). The wellbeing commonly is understood as positive evaluation of the quality of life experience. Any wish of an individual is to improve his/her wellbeing, state of being comfortable, healthy, happy with all (many) sides of his/her daily life. The transformative service research focuses on peculiarities of the role of the services and services customers themselves play in affecting the customer's wellbeing (Rosenbaum et al., 2011).

As all interested parties determine the service value proposition, the wellbeing is also related to all parties concerned (Skálén et al., 2015), such as enterprises, customers, other actors in the market, community. Even if the paper reveals the wellbeing of customer; identifying stakeholders; determining values; shaping the offerings; clearing the value provided; withstanding the alternatives and differentiating; and proofing the evident benefit to other related stakeholders are required.

The subject of wellbeing might be assessed objectively and subjectively, but the essential matter to look at it more deeply from the customer's perspective – to evaluate subjectively how the customer perceives the service value proposition, defining social, emotional, functional welfare as outcomes of service value. According to Rintamäki et al. (2007), the service value proposition, which is defined from customer's perspective, plays the strategic role in suppliers' pursuing the competitive advantage

before others. Even if the service value proposition and customer's wellbeing are two interrelated but independent streams of literature, the literature analysis showed that the link between service value proposition and wellbeing of a customer really exists. Moreover, it might be used in identifying the successful service value proposition in the tradition to the customer wellbeing.

In response to the transformative service research the focus on the value should be resonating, without any unnecessary elements, tangible or (and) intangible. Resonating focus is considered as advance because of basement on points of parity with and clear difference points from supplied by competitors. These two categories are different, but they play the complementarity role: a) points of parity give the same value, functionality, performance to the customer as those of the next best alternative; b) difference points – explicit values, what are extremely different from competitors. Resonating focus in service value proposition is the way, where unnecessary elements in consuming are avoided, the most valuable elements are provided.

Rath, Harter (2010) in their research proved five groups of the wellbeing affecting individuals' life, and exploring elements of the countries wellbeing. The first group relates to the element how an individual occupies his/her time and does every day – *career wellbeing*. The second – *social wellbeing* – tidily relates to relationships and love in the individual's life. *Financial wellbeing* is about efficiency to manage individuals' economic life. *Physical wellbeing* is the fourth element of the wellbeing, guaranteeing good health and energy to get things done. In addition, *community wellbeing* gives the sense of community, of engagement with area of individual life. Measurement of Happiness indexes of individuals, communities refer to objective estimation of wellbeing. This index uses criteria for evaluation education level, literacy, access to health care, mortality, etc.

The research is related to estimation of individual hedonistic wellbeing. Long-term individual wellbeing is tidily related to collective wellbeing and cannot exist separately (Anderson et al., 2013); thus these concepts are used in parallel. Subjective evaluation of the wellbeing is more individual instrument, what depends a lot on individual's estimation of his/her quality of life.

Usually an individual chooses himself/herself the bundle of elements, which satisfies his/her, wishes, what could be improved, etc. The individual decides – what elements of *physical, mental, spiritual* or *social* wellbeing – are the most important for him/her in long period as the transformative service research grounded on long-term impact on the individual's quality of life (see Fig. 2).

These four types of the wellbeing are highly interrelated. As an individual decides himself / herself what it is more important, what elements of wellbeing are crucial, the elements shaping the bundle are provided in the dotted package.

- *Physical wellbeing*, measured on health status: body and mind. On the one hand, improving the physical state enables to improve emotions of the individual, his/her mental and spiritual wellbeing. Disharmony of health status, on the other hand, reduces the satisfaction with life; it is mental, spiritual wellbeing as well.

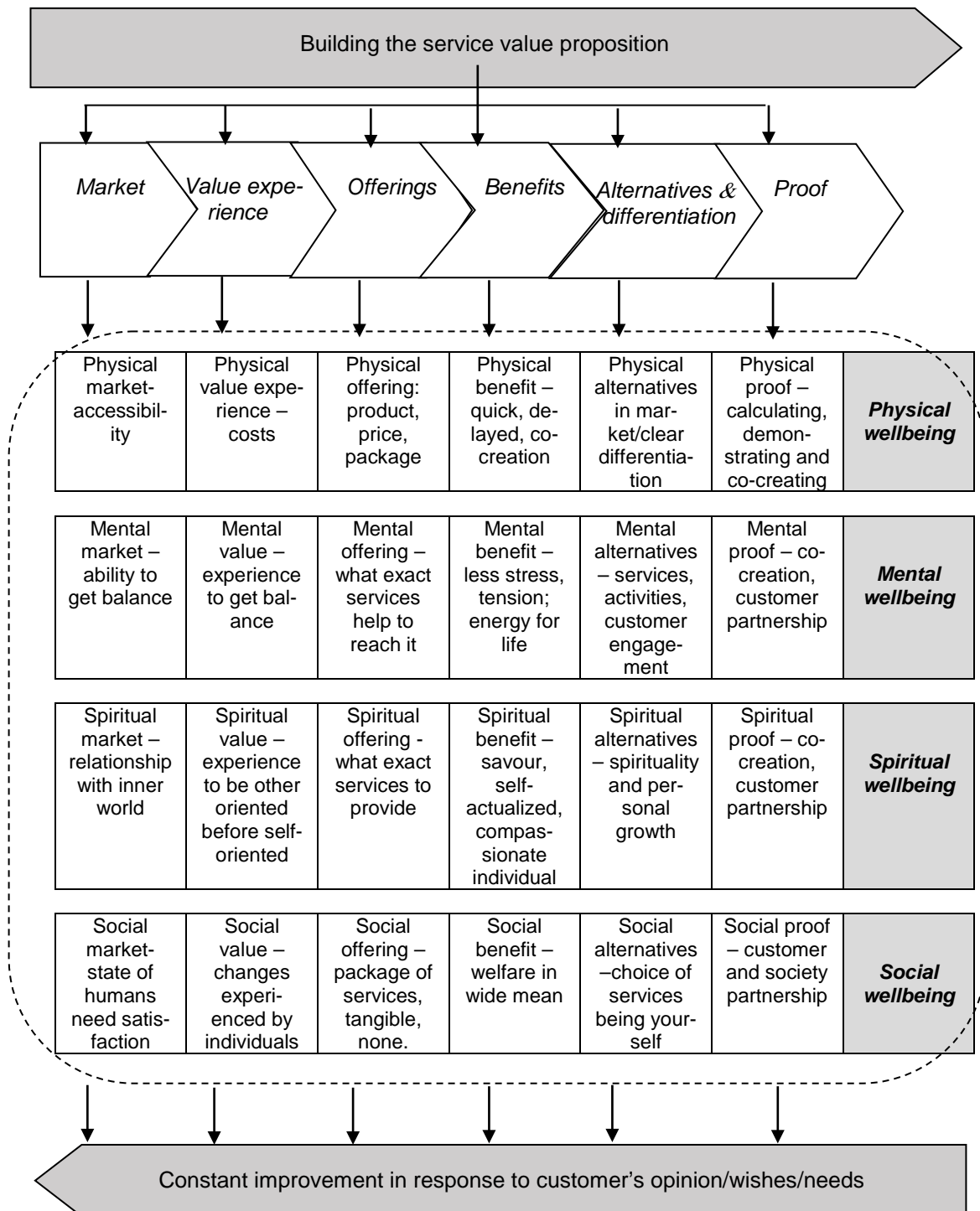


Fig. 2: A framework for identifying service value proposition link to customer's wellbeing

- *Mental wellbeing*, measured on how individual is feeling how he/she can manage with daily stress. Mental wellbeing is evaluated through feeling of satisfaction, pleasure, confidence, engagement with daily family and working life. Individuals' ability to get balance in his/her life.
- *Spiritual wellbeing*, measured on individual's feeling of belonging and relations with the world; his/ her perception of meaning of life. Increasing the spiritual wellbeing let individual to live giving priority to his/her life, refusing from stress,

daily routine, etc. That part of wellbeing is tidily relates to spirit, freedom of relationship and joy with life.

- *Social wellbeing*, measured on what role of community an individual plays, getting satisfaction from relationship with other people. That part of wellbeing is measured on many elements related: food, cloths, and accommodation, education and health services. Economic stability, satisfaction with job, moral standards, and freedom to change the life, income equality, social trust, social networking, and child development – these factors influence the wellbeing of individuals.

Political freedom, peace, stability, equity are external elements creating the positive outcomes for social wellbeing (Hall et al., 2015). Resources, social position, life chances, prestige, psychological profile, integration, personality traits, previous experience, employment, education, integration – all these aspects usually overlap in their parts of the individual's wellbeing.

In detail, shaping the *market element* in the service value proposition, all four parts of wellbeing should be estimated. Physically customers should have access to daily or casual services, local or foreign services providers, commercial and non-commercial services, depending on situation, of course. Mentally service providers should seek the balance for the service consuming, as taking about services or final that is more important looking to the transformative services perspective, many services should help individual to solve daily problems, routine tasks at home, find holiday solutions, etc. Spiritual or emotional wellbeing it is about relationship with environment, other people, himself/herself. Individuals need to feel connected with and significant to others with whom they collaborate (Mende, Doorn, 2014). Building positive relationship is important. In addition, social wellbeing market shaping cover wider aspects of our life, satisfying him/her in security, accommodation, catering, rest organization, etc.

Service researches (Ostrom et al., 2010) use the term *experience* for all aspects of production, delivery and creation of value from customer's perspective. Physical *value experience* covers costs, producing and consuming the service, decrease of value because of age, market conditions, and reduction in purchasing power. Growing economy brings not only increased consuming but also increased costs for services, too. Mental value, sometimes called as mental health, is experience to enjoy the life, to create a balance in all fields of one's life. It is rather subjective well-being, perceived autonomy, competence and self-actualization. Spiritual value experience covers practice to be other-oriented before self-oriented that is important too, but not as high as earlier. It is not related to religious but to humans' belief that he or she is growing spiritually. Social value experience –is experienced changes of environment of an individual, what shapes needs, wishes for their life, as well as consuming services.

Talking about *offerings*, we should remember the resent trend in sustainable world (even a need) of minimising the services package as resonating their value. Delivering service in a sustainable manner, for example, improving health of individuals, (Ostrom et al., 2010) is a priority task for many service business executors recently. The challenge providers meet – how to prepare an offering, covering majority or even all aspects of the customer's wellbeing. Physically it could be realised through service product in a wider meaning, price, and package. However, the service offering usually contains more intangible values than physical ones. The service provider

should think about what exact services help to reach the balance in the individuals' mental wellbeing, balance in routine, busy life. Spiritual wellbeing formulates a task to provide services, which can help to join the community, refuse from unnecessary care about troubles. Social offering covers services provided in wider meaning: package, tangible, intangible value, tangible, intangible offers.

Benefit also has four strains in the service value proposition. Physical benefit and wellbeing of customer depend a lot on his or her co-creation in services. While production item benefit could usually be accessed in advance, the physical benefit depends a lot on how a customer is involved physically, does whether? an outcome is suspected quickly or not (for example, after health care services); as well as on his or her participation in the service production process. It is a large challenge for a provider as many kinds of services have less touchpoints, where services could be displayed physically. Mental benefit for the consumer covers less stress in daily life, new energy for life, business, job, responsibilities, enjoyment in his/her life and environment. Spiritual benefit for individuals manifests in self-actualization, flourishes people, who take time for themselves, to get in peace with themselves. Social benefit of individual has broader meaning, as welfare of a society, in producing and consuming services. Social benefit has a priority in the transformative service research before private benefit.

In relation to resonating focus to *alternatives* in services market, physical wellbeing should be communicated very well. As, in some cases, providers physically can demonstrate their differentiation, it is easier explained for improving physical wellbeing. Preparing the value proposition no provider supposes that he/she is the single one, but creating the exceptional value proposition, with one-two qualitative, clear differentiation with closest competitors (not only geographically) is required. Mental alternatives depend a lot on an individual: one wants passive rest, others – active, one wants engagement into decision-making, service co-production, others not. The service *per se* also affects the shaping of mental alternatives for the consumer. Alternatives for spirituality wellbeing, personal growth depends on an individual, his or her family, peers, and community. The provider should evaluate – wants or not a consumer, consuming the service, to grow, to get or to share knowledge, to participate, to be beneficial for others, and the way to organize that. The consumers usually find positive effect in their wellbeing when they are engaged into the co-production of services (Mende, Doorn, 2014). For example, getting more information about personal investment into financial funds, giving more ideas about health treatment help to a customer to be responsible for his or her decisions, as well as evaluate services as higher quality. Sometimes participating in the service production reduces the fear of a customer depending on a service provider, directly improves the objective wellbeing (i.e. reduces illness, increase literacy, financial stability). Not all services have direct impact on social wellbeing of a society, but educating customers, giving more information about necessity to save the world in minimising damage for environment could be beneficial. Social alternatives mean buying services by not refusing ourselves, being ourselves. There are many alternatives in services market but individuals usually try to purchase and consume services, which they like: music, education, travel, etc.

Proofing the improvement of the wellbeing of an individual is the last step in the service value builder. As improvement of wellbeing is long-term phenomenon, the proof of service value proposition is difficult task for the service provider. Proofing the physical wellbeing of service value proposition providers use calculation and measure-

ment of costs and benefits, experiments, demonstrating visible value for customers. Engagement of customers into the process, after-selling communication could be helpful. Mental, spiritual and social wellbeing are difficult to demonstrate, that is why here customer's participation, co-creation, discussion and constant improvement corresponding to customers wishes are necessary. Demonstrating social wellbeing society's help could be involved, too.

Improvement of the service value proposition consequences the improvement of individuals' wellbeing. Physical wellbeing is to be easier demonstrated, created and communicated. While spiritual and mental depends a lot on an individual and subjective estimation of his or her life. Social wellbeing covers many aspects of individuals' life and depends on tangible, intangible elements of services, individuals' attitude, and relation with family members and other service entities. Covering majority aspects of customer's wellbeing in preparing service value proposition will guarantee the improvement of wellbeing, individual satisfaction with life, with provider, with his suggested service value proposition.

Discussion

The interest for the transformative service research has been growing recently. The drivers in service economy (Gallouj et al., 2015), such as transformative power of new technologies, human capital, transformation and globalisation of markets, changing role of state and other authorities, environmental challenges, will affect well the interest on the transformative service research, too. It is believable that interest and necessity to cover wider field of interests in order to guarantee, to improve the wellbeing of individual – will replace the interest to short-term outcomes of service business and marketing. Improved working conditions, life standard, better access to literacy and education, aging population, increased consuming in many advanced and growing economies shapes more opportunities to engage in community, with sense of membership of wellbeing shaping. The complementarities among entities enhance them own wellbeing as well as other shareholders. According Gadrey (Gallouj et al., 2015), winning services, such as repair, maintenance, local government, services for elderly people, as well as children, have more perspectives in future service economy. That's mean, that new and increased consuming are not exalted, estimating that the service producing and consuming outcomes could be positive, as well as negative: for a customer, family, even a provider and entire community.

Service regression and service extension in the context of the transformative service research should be also emphasized. The resonating focus on the service value proposition formulate a task for a provider to be competitive one with two-three valuable qualities, what it is impossible (almost or hardly) to be copied by competitors, but valuable for customers, minimising negative outcomes (such as damage for environment, for example, for family), and maximising the positive one. To optimize the value of the service is one of the most important tasks (Ostrom et al., 2010). It is a strategic execution priority of any business – to improve wellbeing through the transformative service. As service dominant logic asked scientists about theories and frameworks helpful for the service to move forward, deep absorption of these phenomena might open more opportunities for providers to be competitive.

To keep in step with drivers of the future service economy (Gallouj et al., 2015) and directions of development, sustainable development of the service value proposition, developing several key qualities, covering physical, mental, spiritual and social wellbeing, is required. Changes in technologies are leading to changing how customers serve themselves before, during and after buying services (Ostrom et al., 2015). Higher level of their participation could be both positive and negative for service quality, but shape a sense of co-producer that is in itself good. The customer engagement helps to differentiate the service value proposition, to be unique.

The transformative service research during the last decade covered issues for improvement of many services, such as health, financial, education. As not all services, seem, have direct positive impact on wellbeing, such as retail, hospitality, entertainment (Rosenbaum et al., 2011), etc., splitting kinds of wellbeing of a customer and how he or she perceives service value for him or her – that could help both to understand and to improve outcomes of consumed services. The services have potential to uplifting changes and improvement in customers and communities wellbeing (Sangiorgi, 2011), to create new behavioural and interaction models, as well as new value for all shareholders involved in services processes.

The implications for the transformative service providers are related with regard to special attention to aspects, forming the service value builder on four wellbeing perspectives: physical, spiritual, mental and social. To increase customers' wellbeing, the transformative services providers can make insights how to prepare, to test and to improve their service for long-term success satisfying the customer and guaranteeing their complete wellbeing.

Concluding remarks

This paper provides a theoretical contribution to the service marketing researches by exploring the application of the concept of service value proposition to the customer wellbeing.

Practical implications of the paper reveal the guidelines for practitioners how to formulate new service value proposition or improve it in the harmony to the wellbeing of service customers. We can recommend that service providers might emphasize on their service value proposition builder examining their current value propositions, preferable and considering how it could influence the wellbeing of their customers' wellbeing. Service providers need to be more aware of the value proposition as the enterprise key strategies, but it should correspond to the wellbeing of customers, getting balance in social, physical, mental and spiritual welfare. The link between constantly improved service value proposition and wellbeing of its users has become acknowledged in scientific research recently.

We stress that the service providers should analyse, control and constantly improve their service value proposition through all stages of its builder in order not only to gain competitive advantage (it becomes not the most urgent task) but also to help to improve customer wellbeing. The resonating focus on the service value proposition refusing unnecessary tangible and intangible elements of the value, improving one-two elements and communicating it to the market properly – will guarantee such service value proposition, what satisfies both interested entities (and even more): pro-

vider, as well as customer. Even if narrow specialization in the market seems to be risky, continual maintenance of the value proposition builder in respond to the customers' wellbeing, doubtless, will be proper support in the competitive market in long-term success.

We believe that conceptual framework for link of the service value proposition to customers' wellbeing helps managers of service firms to identify, shape, improve service value proposition in all six steps of value builder, quickly reacting to customer's wishes, needs and appreciation. It helps to distribute service process in the most proper way to balance the wellbeing elements of the customer: his/her social, mental, physical and spiritual wellbeing.

Since the paper has presented a conceptual attempt to frame the impact of service value proposition on customers' wellbeing, empirical research should test the measurement proposed. Future research directions could also explore ways to develop, add, delete, if necessary, other capabilities to evaluate.

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Exploring Customer Value in the Experience Economy Service Encounter: An Exploratory Study

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Customer value has long been researched in both product and service regimes and is considered by both perspectives as a key source of competitive advantage. Despite the considered strategic advantage of the construct of customer value, there remain disparate definitions of this concept. Research on expected customer value in the service encounter within the discipline of hospitality still seems to be in its infancy. The purpose of article, based on an exploratory qualitative study is to attempt to conceptualise how hospitality frontline managers define and/or describe expected customer value in service encounters. The aim being twofold; a) to understand how practitioners, working within the experience economy understand expected customer value and b) how these descriptions relate to and/or fit with or differ from current thinking about value in the experience economy, which may contribute to a better theoretical understanding of value in the experience economy service encounter. Thematic coding of frontline managers' descriptions/definitions of expected customer value in the service encounter revealed an (untested) conceptual framework consisting of six central constructs of expected customer value; Service Value, Behaviour Value, Economic Value, Psychological Value, Social Value and Co-creation Value .

Introduction

For any organisation, but in particular for companies working within the experience economy, understanding what creates customer value can give a competitive edge. The concept of the experience economy is not a new phenomenon. It can be traced back in time to Roman/Greco understanding of selling experiences (Boswijk, Thijssen, & Peelen, 2005). Since the rise of commoditised mass tourism in the 1970s with the advent of jumbo-jets and cost-effective transportation, tourism experiences became subordinate to money generating products with relatively little focus given to the experience (Poon, 1994). Growing affluence in western societies and changing trends in consumer consumption away from mass consumption of tourism products towards self-actualization through experiences, is changing tourism (Cordente-Rodríguez, Mondéjar-Jiménez, & Esteban-Talaya, 2012). According to a report compiled by Earnest and Young, a key emerging tourism trend consisting of increased demand for experience-based tourism is challenging the hospitality industry (EY, 2015). Changes in consumer behaviour towards experience as a key value driver, suggests a need for the tourism industry to shift from modernity driven commoditised mass-tourism thinking towards a post-modern understanding of tourism as a co-created experience rather than a product. Understanding and reacting to this shift can be a source of competitive advantage (Prahalad & Ramaswamy, 2004).

One of the core concepts of the experience economy is adding to customer value by creating memorable experiences ((Otto & Brent Ritchie, 1996; Sørensen & Friis Jensen, 2001). Customer value is a much researched phenomenon, extant literature reveals disparate understandings and definitions of the construct from both organisational and customer perspectives (Bille, 2010; Bitner et al, 1990; Gronroos, 2006; Parasuraman et al, 1985; Sheth et al, 1991; Sheth & Uslay, 2007; Vargo et al, 2008; Verhoef et al., 2009). However, there seems to be limited empirical evidence or research focused on how *front-line practitioners* understand customer value.

The purpose of this paper is to unveil how front line managers working in the Danish experience economy understand customer value. Given the strategic advantages implied with a shift from product/service based to value adding experience based management, how do practitioners who are expected to facilitate customer value, understand the concept of customer value? What value do they expect a customer to take away from a service encounter? In order to answer these questions, the paper has been structured as follows: firstly, a

discussion of the central concepts used is conducted; a) as “expected customer value” is examined in the context of the service encounter, the phenomenon of the service encounter is briefly discussed; b) because the study is set in the context of the experience economy, and the two constructs of experience and value are central and intertwined in the experience economy, an abbreviated discussion of these concepts follows; c) given the focus of the study, the concept of customer value is also debated. Secondly, the methodology used to explore frontline managers’ understanding of customer value in the tourism service encounter is explained. Thirdly, an analysis of the available data will be presented followed fourthly, by a conclusion including limitations and implications.

The Service Encounter

Extant service literature reveals varying definitions of service encounters ranging from undefined periods of time where a customer as any interaction with a firm to clearly defined touch points (Bitner et al., 1990; Mattila & Enz, 2002; Mattsson, 2009; Surprenant & Solomon, 1987). Service encounters have further been defined by Surprenant and Solomon (1987) as having a human element. Bitner et al (1990) present four typologies of service encounters based on the perceived level of customer participation (Bitner et al., 1990). These typologies range from low levels of customer participation to high level customer participation, where low participation is classified as merely the presence of the customer and little else, and high participation where the customer is engaged in co-creating the service product (Bitner et al., 1990). Shostack (1985), on the other hand, defines three concrete types of service encounters from remote encounters to telephone contact to face-to-face interaction (Shostack, 1985).

In tourism literature Otto and Brent Ritchie have noted the “intimate, hands-on nature of the service encounter” (Otto & Brent Ritchie, 1996). Sørensen and Jensen distinguish three types of tourism encounters one being the customer/employee interaction, the second being customers’ usage of companies services and communication encounter, described as sales and marketing activities (Sørensen & Jensen, 2014). Moreover, Sørensen & Jensen highlight the special nature of the tourism encounter as these encounters can also embody “the end; the actual tourism experience” (Sørensen & Jensen, 2014). In the context of this study, service encounters are taken to be the face-to-face interactions between staff and customers mostly occurring on the front-line. Recognition is, in this study, given to the fact that there are varied kinds of service encounters of both typology and temporality.

Experiences and Value

It could be argued from the customer point of view, that the main purpose of the tourism industry is to expedite experiences. From the organisational perspective, the better the customer experience, the more value perceived the greater the chance of positive word of mouth (free marketing) (Taghizadeh, Taghipourian, & Khazaei, 2013). Positive word of mouth has the dynamic effect of attracting new customers with comparatively less effort than strategically designed marketing strategies. Also, the better the experience the greater the chance of customers returning the higher the probability of retaining the customer and increasing potential for augmented revenue (Mittal et al., 2005; Swanson & Hsu, 2009). Furthermore, Pine and Gilmore argue that customers are willing to pay higher prices for “an experience” describing this phenomenon as the fourth source of value (Pine & Gilmore, 2013). In the experience economy, experiences and value are inextricably linked. Boswijk et al make a distinction between experiences and meaningful experiences (Boswijk, Thijssen, & Peelen, 2007). They define experiences as; *“An immediate, relatively isolated event with a complex of emotions that leave an impression and represent a certain value for the individual within the context of a specific experience”* (Boswijk, Peelen, & Olthof, 2011, p. 60). On the other hand, they apply Snel’s definition of meaningful experiences which is *“Experience is a continuous, interactive process of doing and undergoing, of action and reflection – of cause and effect – that is meaningful to the individual in (more than one) different contexts of his*

life, An experience causes an individual to change his perspective on the world and/or himself (Snel, For the love of experience, 2001)".

From these two definitions, a compelling argument can be made that the more profound the experience, the more memorable and longer lasting it will be and the greater the value will be attributed to it. In the experience economy, organisations should be aiming to create profound, long lasting (positive) experiences that are remembered and talked about with others. Due to the inherent nature of the tourism product, customer involvement in the production and consumption of the experience is essential (Sørensen & Jensen, 2015). Service Dominant Logic (SDL) emphasises the role of the customer in co-creating value which is also a prerequisite for the creation of memorable experiences (Gronroos, 2006; Vargo & Lusch, 2004; Vargo et al., 2008). Chandler and Vargo argue that experiences related with the purchase of a product are essential for the realisation of its actual value (Chandler & Vargo, 2011).

Customer Value

As with service encounters, the concepts of value and customer value have varying definitions ranging from the purely economic definition of transactional value and cost, benefit, sacrifice evaluative value (Zeithaml, 1988) to service marketing definitions of value-in-use, value-in-context and co-created value (Grönroos & Voima, 2011; Prahalad & Ramaswamy, 2004; Vargo et al., 2008). Untangling these varying definitions is a challenging enterprise, as Day (2002) notes "a thorough understanding of the concept remains elusive" (Day, 2002), and it is beyond the scope of this paper to nail down a paradigmatic definition of customer value. That being mentioned, some central concepts of value will be discussed. Woodruff defines two perspectives of customer value "organisational value that quantifies the monetary worth of individual customers" (Woodruff, 1997) and value from the customer perspective he labels as customer value (Woodruff, 1997).

Smith and Colgate later refine these two perspectives where customer value is that value perceived by the customer (value gained) and value for the firm defined as customer lifetime value (Smith & Colgate, 2007b). The focus of this paper is the former, however seen from the firm perspective; in other words, a "company interpretation" of customer value through the voices of frontline managers. Growing recognition in service marketing literature of the central role of the customer in creating value, has given rise to concepts such as value co-creation and value in use. In tourism the customer plays a central role in value creation as it is often the experience that can create or destroy value, and the tourist is an active player in creating the experience. As noted by Grönroos & Voima, companies can only ensure value propositions, it is the customer who decides whether to partake in the proposition and thus "co-create value" and "value is socially constructed through experiences" (Grönroos & Voima, 2012). Thus, value-in-use is a longitudinal evaluative process individual to the customer and his/her experiences.

Value in context, on the other hand is defined as value determined by specific environmental contexts within specifically a network setting (Chandler & Vargo, 2011; Helkkula, 2009). Various conceptual frameworks of value have also been presented, most notably by Sheth et al (Sheth et al., 1991), Holbrook (Holbrook, 1998), Smith and Colgate (Smith & Colgate, 2007b) and Woodruff (Woodruff, 1997). Given the context of this study, it is interesting to contemplate which, if any, of the above definitions of value will be applicable to how practitioners working within the experience economy, more specifically the hospitality sector, understand customer value. In other words, how do front line managers understand customer value in relation to the theories already mentioned?

As service encounters have long been recognised as the mechanism by which customers evaluate value (Palmer, 2004; Surprenant & Solomon, 1987). It therefore stands to reason, with the action of the service encounter and interaction with customers, frontline managers can develop an evaluation of expected customer value. Therefore, in this study, the face-to-face service encounter was used as the unit of analysis. Front-line managers were chosen to be the initial source of information, as they are responsible for operationalizing the strategies and values of organisation (Lockwood & Jones, 1989). Additionally, they

typically over-see, if not have the direct responsibility for, training front-line employees, which was confirmed by many of the interview respondents. Finally, many front-line managers have held front-line employee positions and often experience customer contact on a daily basis. Thus it was considered that they would be reliable, experienced and credible evaluators of customer value. The responsibilities

Methodology

Taking a constructivist grounded theory approach (Charmaz, 2014, pp. 14–15), no one particular theory was operationalised in the development of the data collection instrument. However, although one of the guiding principles of grounded theory is to begin without any specific theoretical framework (Glaser & Strauss, 1967), inspiration from already existing theories on value and customer value were used as pointers to develop the open questions for the semi-structured interview guideline. As is the principle of grounded theory, the results of this study are data driven rather than hypothesis driven (Charmaz, 2014; Glaser & Strauss, 1967). As mentioned above, the motive was to understand how frontline managers understand customer value. As exploratory research is particularly useful when there is a need to develop new understandings of existing phenomena (Mouton & Marais, 1998) this approach was taken. The explorative semi-structured interview data collection instrument was a 15 item interview guideline with open questions centred on two central themes: 1) frontline managers' understanding of the service encounter, and: 2) their understanding of value in the service encounter. In the latter case, respondents were asked (amongst others) to describe both; what they thought gave customers value in the service encounter; and were also encouraged to tell stories/incidences which exemplified customer value. In this paper, the focus is on the responses to the latter two questions.

The choice of using open-ended, semi-structured interviews was based on Brinkmann and Kvale's category of conceptual interviews whose purpose is conceptual clarification (Brinkmann & Kvale, 2015, p. 176). Conceptual interviews "explore the meaning and conceptual dimensions of central terms" (Brinkmann & Kvale, 2015, p. 177). According to Brinkman and Kvale (2015), conceptual interviews can "serve to uncover respondent's discourse models, that is, their taken-for-granted assumptions about what is typical, normal or appropriate" (2015, p. 177). Therefore, the purpose of the semi-structured interviews was to attempt to reveal frontline managers' taken for granted assumptions of customer value.

The interview guideline was debated in a focus group session consisting of a group of selected interviewers to ensure common understanding of the questions and agreement on recording techniques. This group tested the guideline to judge informant understanding of the questions and the guideline was readjusted according to feedback. The guideline was pilot tested by teachers in a Danish educational institution, who undertook thirty interviews across a broad range of service sector companies. From this pool, fifteen interviews were selected using two pre-determined criteria: 1) chosen companies had to fit within the Danish Association of Hotels, Restaurants and Tourism's (HORESTA) classification of the experience economy "tourism, hotels and restaurants only" (Road, 2012); 2) Informants' sector experience had to exceed one year. It was considered that the longer the sector tenure the higher informant credibility through more experienced accounts. Interviews not meeting these two criteria were excluded from the analysis. The selection of interviews resulted in a cross-sector group of interviewees who had an average working tenure of approximately 10 years. The majority were women and the highest educational level was at Bachelor's, although the majority of the informants had taken a two year tertiary level education with focus on the service sector. Most of the participants worked in the hotel sector although 3 represented the restaurant sector and one represented the cruise sector. The interviews were recorded and transcribed verbatim in preparation for a thematic coded analysis.

Analysis

According to Mills et al, thematic analysis is not so much a research approach, but is more an analytical method (Mills, Durepos, & Wiebe, 2010). Thematic analysis is useful for analysing and making sense of large amounts of data (Mills et al., 2010). Thematic analysis relies on the creation of codes to identify patterns, relationships and repeating themes and topics. Data driven coding is one of the key analytical tools of grounded theory (Charmaz, 2014, p. 109; Glaser & Strauss, 1967, p. 36). As customer value was only one of various themes in the semi-structured interview, the initial coding focused on sections of the transcript where respondents specifically explained customer value or specific stories reflecting customer value were given. These descriptions and narratives were consequently positioned into a coding framework. Admittedly, this process ran the risk of taking the descriptions out of context, but care was taken to include the entire discussion from the start of the invitation to describe customer value until the context was changed with an entirely new topic such as company value derived from the service encounter. Additionally, each interview was thoroughly combed for direct or indirect references to customer value as a result of interviewer probing, which were also included in the coding framework. After close reading of the selected sections, the process of identifying initial coding categories started. Initial codes created were simple classifications of, for example, demographic aspects of the respondents, requiring no definition. After which, more advanced codes in the form of abbreviations such as CHCA were attached to common descriptions of leisure tourist's preferences for, for example, conducting casual information exchanging conversations with staff which was one typical example given of customer value. Each code assigned a particular word used to describe customer value was then defined as in the example given above. The coding process continued until all coding categories were all inclusive, in that all response possibilities were included (Gorden, 1998). After all the codes had been defined, they were refined so that they became mutually exclusive so that no one code could fall into two categories simultaneously (Gorden, 1998). The coding process proceeded hermeneutically in a back and forth process between the text and the codes until a pattern of six theoretical categories emerged.

The six categories have been labelled 1) Service Value, 2) Behaviour Value, 3) Economic Value, 4) Psychological Value, 5) Social Value and 6) Co-creation Value. Table 1 below, shows the six categories and a selected example of some of the words used by frontline managers to describe customer value in the service encounter.

Table 1: Six Categories of Customer Value from Front Line Managers' Perspectives

Service Value	Behaviour Value	Economic Value	Psychological Value	Social Value	Co-creation Value
<ul style="list-style-type: none"> • Fast • Effective • Efficient • Mistake free 	<ul style="list-style-type: none"> • Appropriate staff behaviour • Respect • Take time • Solve problems • Personal attention/service • Staff 	<ul style="list-style-type: none"> • Value for money • Extra services • Free "gifts" 	<ul style="list-style-type: none"> • Unique • Gems • Local experience • Relax • Fun • Feel good • Comfortable • Home 	<ul style="list-style-type: none"> • Social interaction with staff • Social interactions with other guests • Brand (esteem) • Lifestyle • Social journey 	<ul style="list-style-type: none"> • Participation

	knowledge		<ul style="list-style-type: none"> • Surprise • Memorable 	<ul style="list-style-type: none"> • History 	
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Source: 15 interviews from eight hotels ranging from three to five stars, one upper-range hostel¹, two mid-range to fine-dining restaurants² and one cruise agency.

Service value, as explained by the respondents, is the value the customer gets from the service itself. That is, a smooth, fast and efficient well-functioning service is considered to add value to the customer. This category can be equated to Sheth et al's (1991) and Smith & Colgate's Functional Value (2007a). There is dissension in the service literature of the relationship between quality and value; as to whether quality is a function of value, whether they are two separate constructs or if value is derived from quality (Graf & Maas, 2008; Sanchez-Fernandez & Iniesta-Bonillo, 2007; Sweeney & Soutar, 2001). It seemed apparent, in the various interviews, that most of the respondents agreed high service quality would create value for the customer. It could be argued, due to the intense focus on service quality during the 80's and 90's (Brady & Cronin, 2010; Grönroos, 1984; Parasuraman et al., 1985) and with the popularity of quality instruments such as Servqual (Parasuraman et al., 1985), that service quality (from the customer perspective) is these days taken as a given requirement.

The category termed "behaviour value" was derived from the many repetitious explanations and descriptions related to appropriate staff behaviour creating value for customers. In fact, the interviews revealed that appropriate staff behaviour seemed almost more important than service value. From the interviews, appropriate staff behaviour included smiling, having eye-contact, positive greetings, recognising the customer, listening to the customer etc. Smith & Colgate's (2007a) study include appropriate staff behaviour as part of functional value, whereas Sheth et al's (1991) functional value is merely limited to how well the product/service serves its function or purpose. Woodruff's (1997) discussion of customer value does not include staff behaviour evaluation as a source of value but, like Sheth et al, (1991) is limited to "product attribute" evaluation (Woodruff, 1997). There is extensive research on the relationship between employee behaviour and customer satisfaction (Kattara, Weheba, & El-Said, 2008; Mittal et al., 2005; Seidman & Johnson, 2002) (to name but a few) indicating a positive relationship between appropriate employee behaviour and customer satisfaction. As well, evidence has shown a positive relationship between perceived value and customer satisfaction (Gordon & McDougall, 2014; Heinonen, 2006). Moreover, as the scope is the hospitality sector and much of hospitality literature emphasises the importance of positive employee behaviour (Kattara, Weheba, & El-Said, 2008; Mittal et al., 2005; Seidman & Johnson, 2002), behaviour value could only perhaps be considered unremarkable if this were *not* mentioned. It could be relevant here to raise the question, given changing customer/tourist behaviours towards value giving experiences rather than "products", as to whether perceived service quality and behavioural value are now, in the minds of customers, actually hygienic factors rather than serving as value adding factors? In other words, value is created merely because these are present in the service encounter? Perhaps a well-functioning service is only really noticed if it does not function and/or staff behavioural aspects are non-positive.

The category of economic value arose from respondent comments related to perceived customer evaluations of price versus expectation, (such as "is this what I paid for") and remarks related to customer appreciation of "free gifts" or perceived extra services. Economic value can be equated to Smith & Colgate's cost/sacrifice source of value (Smith & Colgate, 2007b), but which is included in Sheth et al's functional value (Sheth et al., 1991). Holbrook's (1998) typology of consumer value does not include the economic aspect of customer value which is, however, extensively discussed in other literature relating to this con-

¹ An upper-range hostel is classified as having a higher price than typical hostel prices

² Mid-range to fine dining classification of restaurants was done on a price base evaluation.

struct (Graf & Maas, 2008; Grewal, Monroe, & Krishnan, 2014; Sanchez-Fernandez & Iniesta-Bonillo, 2007; Zeithaml, 1988) (to name but a few).

The psychological value category was derived to distinguish descriptions of customer value from “external” factors, that is, those factors that externally facilitate value, from descriptions of the “internal” value evaluating process of the customer. In other words, the value creating elements of the service encounter which reside in the mind/desires/expectations of the customer. This category could be equated with Sheth et al’s (1991) emotional value, Holbrook’s (1998) intrinsic and other-oriented typology or Smith and Colgate’s experiential/hedonic value category (2007b). It can also be found in Otto and Brent Ritchie’s “psychological environment, which they describe as the “subjective, personal reactions and feelings experienced by consumers as they consume a service (Otto & Brent Ritchie, 1996). As can be seen in table 1 above, words, expressions and phrases related to this category indicate a subjective, customer oriented perceived value. In the words of the respondents, value for the customer in the service encounter went beyond staff behaviour and service quality towards an element of specialness and unexpectedness for customer. In tourism literature, this uniqueness often refers to experiential value (Graf & Maas, 2008; Grewal et al., 2014; Sanchez-Fernandez & Iniesta-Bonillo, 2007; Zeithaml, 1988). According to Helkkula et al, (2012), experiential value is “value in the experience [considered to be } the value that is directly or indirectly experienced by service customers within their phenomenological lifeworld contexts” (2012, p. 61). It has been argued in literature that experiential or psychological value is an aspect of customer value previously understated in earlier research, but which emphasises a holistic concept of value (Turnbull, 2009).

Social value was driven from the data by often-repeated comments that customers experienced value in the service encounter if they were given opportunities, or made opportunities, to engage in informal, knowledge exchanging activities with either members of staff or with other customers. The social element of this category also included indications that customers wanted to engage with the local community and not be “just tourists” removed from or superficially engaged in the local environment. Social value is discussed in Sheth et al’s five value framework as perceived value of symbolism and image in reference to other groups (Sheth et al., 1991). Smith and Colgate categorise social value within the symbolic/expressive source of value in their value framework (2007a). That is, their category of symbolic/expressive value has an element of creating social meaning through, amongst others, interactions (Smith & Colgate, 2007a). It was evident from the interviews that this category was considered an important part of value creation for customers, even if the effort to facilitate these interactions was not necessarily value creating for the respondents.

The final category called co-creation value was not created from the data as a representative category, but simply because of its comparative insignificance in the descriptions given by the respondents of customer value. That is to say, co-creation of value and recognition of the customer’s role in creating value was only mentioned by two respondents. Given the theoretical recognition of the inextricable nature of tourism, experiences and value (Boswijk et al., 2007; Forder, Sørensen, & Jensen, 2014; Sørensen & Jensen, 2015) and considering the respondents all worked in what is considered to be an element of the experience economy (hospitality and tourism) (Oh, Fiore, & Jeoung, 2007) the absence of descriptions regarding the customers’ role in creating value could be regarded rather unusual.

Conclusion, Limitations and Future Research

As customer value has been defined as an holistic, a-priori, active, post-priori evaluative activity influenced by past experiences with a temporal element created in part by the customer (Grönroos & Voima, 2012; Oh et al., 2007; Sørensen & Jensen, 2015; Vargo et al., 2008), it can be considered problematic to categorise the concept in a flat non-dynamic fashion as has been done in this article. However, it is important to remember here that these categories were data driven without prior reference to a specific theory. It is therefore very interesting to note that the data driven categories are very similar to Sheth et al’s five value framework (Sheth et al., 1991) and Smith and Colgate’s four value framework (Smith & Colgate, 2007b), thus confirming the rigorousness of these conceptual frameworks of cus-

customer value. An arguably significant difference to both of these theories is the category of co-creation value, which is not an explicit category found in either Sheth et al or Smith and Colgate. Additionally, theoretical reference to value-in-use and value in context is equally applicable to the empirical categories mentioned giving credence to these definitions of value. Two interesting variances between, for example, Sheth et al (1991) and Smith and Colgate's (2007a) studies and this study are; firstly, aforementioned studies are not empirically based in Denmark, which could prove that customer value, as perceived by frontline managers, is well supported by customer value theory across national boundaries. Secondly, this study, unlike the study conducted by Sheth et al (Sheth et al., 1991) was undertaken in the hospitality industry, indicating that perceived customer value may not vary significantly between service vs product based industries. Additionally, although the empirical evidence for Smith and Colgate's (2007b) research is unclear, their study, similar to this investigation, also seems to be based on a multiple case analysis. In this study, representatives of a mixture of hospitality industries were interviewed resulting in very similar results. Finally, it needs to be highlighted, that the results of this research is founded on the interpretations of experienced frontline managers, they are just that, interpretations which could fit with any definition of value one propounds. Two conclusions can be tentatively drawn from this study. The first conclusion could be that frontline managers have a thorough understanding of what creates customer value supported by available theory and as evidenced by their descriptions of customer value. On the other hand, given changing consumer trends, and the resulting interest in experiences as value-creating mechanisms, an alternative argument could be proposed; that frontline managers in the hospitality sector have a "standardised" conception of consumer value and are perhaps lagging behind the consumer quest for experiences.

The analysis shows that frontline managers do make reference to good experiences, so there appears to be general awareness of the importance of experiences. Yet only sporadic use of the central terms and concepts of the experience economy is in evidence. It could be argued that frontline employees are not actively focussed on creating memorable, unforgettable experiences for customers but are perhaps more focused on other elements of the service provision, such as the service function and employee behaviour.

This study has implications for the Danish tourism industry at sector, organisational and hospitality educational levels. At a sector level, it raises questions as to whether the Danish tourism industry is managing to compete successfully for the experience seeking tourist and encourages further research as to whether this is the case or not. From an organisational perspective, further research needs to be done in order to understand if and how organisations are working to create the conditions desired by today's tourists. Finally, research into current hospitality programmes needs to be carried out to understand how new trends in the tourism sector are being incorporated into educational platforms and whether they are successfully educating experience economy employees.

Some limitations should be considered regarding this study. Although interviewees represented a broad cross-section of the tourism industry, organisations working exclusively with experiences, such as museums, amusement parks and the like were not represented, thus the potential views of these sources are not represented and may present a very different picture than that of these informants. The purpose of this study was to investigate how frontline managers describe customer; as a result the perspective of the customer has not been included in the research. This could be seen as a limitation, given the central role of the customer in the experience economy and co-creating theories. However, with the discovery of a sixth category denoting co-creation as a value creating factor for the customer in the service encounter, a strong case can be made for the need for further research in understanding customer value.

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Clarifying Service Classification Concepts: An In-Depth Literature Review

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Very different views, meanings, concepts, and definitions of services are illustrating the importance of service classifications and the need for service classifications. To conduct a comparison and to detect current research gaps seems to be impossible, because of the extreme variety of service classifications. An in-depth literature review is an effective method of choice to clarify service classifications. New three- and multi-dimensional service classifications must be developed. The focus is on representing hybrid service bundles. Service classification researchers must reflect the service technology use, service encounter, and service time consumption. Service modelling languages can be developed or enhanced on this basis.

1. Introduction

There are numerous different types of service classifications with highly diverse dimensions, scopes, and representations developed in the service science literature. This high variety leads to the objective to clarify the existing service classification concepts. The stimulus for this research paper has its origin in the many different views, meanings and definitions of services stated by various scientific authors. Therefore, an overview about the term service is stated to illustrate why it is important to know the diverse possibilities for service classification. The heterogeneous definitions of services are reflecting the various service classifications with highly different dimensions and amounts of dimensions. This multifaceted overview of meanings of services and classifications emphasizes the importance of the three associated **research questions**:

- **RQ1: Which service classifications concepts exist in the literature?**
- **RQ2: Which concepts are demonstrating research gaps?**
- **RQ3: Which service classifications must be developed in further research?**

It is known, that there can be found many various forms of service classifications in the literature, but they are extreme different in their views, dimensions and representations that as a result none of these will exactly fit into the needs e. g. for digitalization or hybridization of services. Each service classification will only describe some attributes to structure such a classification framework. The missing concepts represent the research gaps for the development of a new service classification framework e. g. for digital services or hybrid service bundles distinguished by the different allocation degree of both material products and immaterial services. Services clarified by their attributes like their skills for digitalisation or hybridization have an impact on significant conceptual insights for further service science research.

Hence, the service definitions and service classifications are described first (see section 2). After that step the conducted in-depth literature review is explained based on guidelines (see section 3). In the fourth step the developed three-dimensional literature conceptualization framework is established (see section 4). Fifth, the literature review results are presented (see section 5). Then, the concepts of service classifications are discussed (see section 6). Finally, an outlook is stated (see section 7).

2. Literature Review Background

2.1. Service Definitions

The term service encounter refers to any kind of interaction between customers and service providers according to Surprenant and Solomon (1987). Every customer is unique and therefore a personalized service must be offered. Interaction is a critical determinant for the degree of customer satisfaction. In a person-to-person situation, the service provider can strategically react on the customer's needs.

Also Bitner et. al. (2000) recommends the definition that every single service encounter is an opportunity for a company to sell itself in terms of customer satisfaction, customer loyalty, word of mouth, sales and profitability. These service encounters exist in actual service settings, over the phone, through e-mail or the internet. The central objective is to increase the customer loyalty by satisfying its personal desire and needs. They point out that traditional service industries are hotels or banks.

For instance, digital services are independent, tradable performances which are provided by the digital service skills of the vendor (potential dimension) and by the integration of the external factor with the aid of digital data exchange (process dimension) targeting an effective impact on the external factors (result dimension) (Bruhn, 2002).

Hence, customer integration means customer participation with a central meaning for the service production and it focuses on the cooperation process between vendors and customers. In this view the customer has the position of a co-producer of the service. He works together with the vendor during the service production process, which emphasizes this central meaning of the customer participation. The customer moves himself for the service delivery in the observable service area, so called service encounter, which is characterized by the rooms of the vendor (Fließ, 2006).

Customer integration can be seen as an active participation of the customer on a contractual specified service preparation with contribution of external factors or take-over of subservices with the result that the service activities of the vendor are influenced or partial replaced (Büttgen, 2007).

Inside the product development process the customers have different functions and are an important part of the service. A customer as a service recipient can be seen as a resource when generating and creating new ideas. Additionally, a customer can become a co-producer in relation to the concept and design of the service. By testing a specific product or service the customer takes over the role as a regular producer. As a buyer the service recipient takes part when creating ideas in the market introduction of a product or service (Lattemann et. al., 2008).

The development of web 2.0 leads to customers who are taking over the role or function as a producer of products, services, and information. Forms of information produced are web blogs, wiki systems, online communities, or virtual realities. User created content in any arrangement dominates the internet, where users are able to publish content (Büttgen, 2009). That is why services are seen as performances for their preparation or delivery and why the participation or integration of the customer in the service production process is absolute necessary. The integration of the customer takes place in three different and simultaneously possible approaches. First, the customer as a person produces active services. Second, the customer provides one or more objects, animals, plants or his body with the result that changes can be realised on these external factors. Third, the customer provides information to specify the service. The service process result is then intangible (Fließ, 2009).

The meaning of service integration focuses on the integration of the external factors and immateriality. Recognising that fact, sales objects of service vendors are service skills of humans or object systems, especially of machines, which are produced on the basis of internal factors direct on the humans or objects of humans, both are seen as external factors, with the objective to cause changes or keep conditions. Concentrating on the service process in which the integration of the external factors occurs during the service preparation has an effective impact. Services are independent and tradable performances with three dissimilar orientations. First, in the potential orientation performances are linked with the provision or use of service skills. Second, in the process orientation internal and external factors are combined during the service preparation process. Internal factors are for example business rooms, employees and trainings. External factors are not in the range of influence of the service provider. Third, in the result orientation this factor combination of the service provider has the objective to achieve an effective impact on the external factors like on humans or objects of humans (Haller, 2010).

The quantity of these interacting resources, which are delivered by the customer and the service provider, are building a service system. Services are offered functionalities, which are produced by the interaction of resources. This functionality leads to a change of the condition of minimal one resource of the service system. At a minimum one of the changed resources must belong to a customer for whom the change represents a value (Böttcher, 2011). Since web 2.0 customer integration has developed from its basics to a digital form of customer integration. This process has been taken from customer integration 1.0 to customer integration 2.0 (Fließ et. al., 2011).

Customer integration means that consumers are integrated into business processes by using provided resources and receiving a more active role by completing tasks on their own. In the passive role a customer who does not take part of the actual process can be called inert, whereas a customer without motivation or time receives the status idle. Active roles of customers can be split into two groups with direct and indirect relationships between customer and service providers (Heidemann et. al., 2012).

Georgi and Mink (2013) state that since the development of the web 2.0 the service encounter have changed in terms of a stronger connection between the service customers and service providers. The services of a provider for a customer have been enhanced due to new service technology as a key element of service digitalization. Customers become co-producers in the service production process and influence the service output quality directly.

2.2. Service Classifications

One established service classification consisting of active and passive roles for customers is described by Mersha (1990). These customer roles are defined in a contact model. The active role of a customer is defined as a direct contact between the customer and the service provider. The passive role is defined as the contact between the customer and service system. A hybrid role as a form of passive and active role is possible as a service output as well.

Meier and Piller (2001) categorize the digitalization of services into four groups: differentiation services, service modularization, add-on-e-services, and core e-service customization. The differentiation services with low support or even no possibility for digitalization count toward secondary services. Examples are repair services or delivery services. Service modularization counts toward primary services. For instance, a hospital that offers additional services such as further treatment or better rooms can be described as a type of modularization. The add-on-e-service as another secondary service can be digitalized. That means complete service transactions and service provisions are possible digitally. Even providing personalized services for customers will provide a higher chance for customer loyalty. The core e-service customization is positioned within the group of primary services like consulting services and information services.

Chase (2010) classifies service systems by a range of required customer contacts during the production of service products. He differences services into three groups: the pure services, mixed services and quasi-manufacturing.

Salegna and Fazel (2013) developed a service classification to illustrate the degree of service customization. This degree is described by a fragmentation into a high and low level of customization. The high level of customization represents an emphasis on service customization, meaning individualization, personalization and customization of services. In contrast, the low degree of customization characterizes a lack of customization of provided services or offered products. In the dimensions of services and products another fragmentation into attributes represents the labelled degree in terms of tangibility and intangibility.

3. Literature Review Guidelines

3.1. Literature Data Collection

The resulting benefit of the literature data collection is characterized as a state of the art in the field of service classifications. Hence, a research path for revision and as a basis for arrangement of the various findings is drawn. Innovative findings, influences, senses, and literature review carefulness are addressed (Webster; Watson, 2002). The challenge was to decide to include relevant articles. To avoid gaining only keyword literature, the life circle of the searched keywords and discovered changes over time in these key terms are also studied. Constantly, the literature is observed with a topic based lens represented by the research questions, which addresses the phenomenon of diversity in the service sciences specified by the various service definitions and service classifications (Levy; Ellis, 2006).

First, the literature review scope is defined. The focus is to learn from the service research outcomes and the goal is to detect the central issues. Therefore, the literature review organisation is conceptual. The perspective is to grasp a neutral representation without personal opinions. The scholar is called service science. The coverage of the in-depth literature review is stated as representative (vom Brocke et. al., 2009).

Second, the research topic is also conceptualized. Mind mapping is used to link the discovered central search terms and handbooks for teaching students to outline our working or topic definition. The search strategy is in-depth, because of the sample of journals and conferences which are relevant (vom Brocke et. al., 2009).

Third, the start of the literature search characterizes the top ranked journals and conferences in the field of service science (Based on VHB). It is searched in the databases of these journals and conferences, both with the developed set of keywords like service typology or service classification. A backward and forward literature search is realised. In the backward search older literature is detected, which are cited in the research articles. Further references are discovered during the forward search of articles, which cited the articles. The sum of literature is limited by analysing the article contents in the following order: titles, abstracts and text with regard to the visualized service classifications (vom Brocke et. al., 2009).

Fourth, a literature analysis and synthesis is accomplished. Therefore, the concept matrix of Webster and Watson (2002) is used to foster the discussion. It segments the on-topic concepts in different units of analysis and arranged and synthesised the ex-ante research results completed by other service scientists.

Fifth, as a result of the in-depth literature review a research agenda is obtained. The basis of this agenda is the concept matrix and itself can be seen as a basis for further literature reviews. The empty fields in the concept matrix mark or highlight the concepts or research fields, which are significant important for further research. These empty fields are demonstrating the research gaps. In this research paper, the major findings of the in-depth literature review are presented (vom Brocke et. al., 2009).

3.2. Literature Data Analysis

The literature data analysis is based on the concept matrix of Webster and Watson (2002) and demonstrates how the relevant literature is analysed (vom Brocke et. al., 2009). It is critical to know that one or more relevant concepts can structure one or more relevant articles. This is familiar to Webster and Watson (2002) to handle the application of the literature. The target is to identify, why the offered information in the literature is important. To find patterns, relations and findings to underline associations is essential. Therefore, different forms of conceptualization based on the literature data sets to gain new knowledge are applied. The result of this literature data analysis process is a contribution to the body of knowledge (BoK). A concept-centric approach is conducted following the question: how are the research results linked with the research questions? The research results demonstrate a better comprehensible BoK (Levy; Ellis, 2006).

There is no intention to argue critical, but to review the literature from a neutral position by the research results. The completed researches of service scientists are respected and decisions to include the literature into the existing research stream are

made very carefully. Compromises are realised to focus on the knowledge, which is accumulated during the in-depth literature review. The target is to define the agenda for the further research and to state recommendations how to close existing research gaps. In the concept matrix is highlighted what is known and what is essential to know. Therefore, this completed research paper focuses on different service classifications. It is argued from a concept, empirical and practical point of view. These points of views are discussed and evaluated frequently to ensure the quality of the conducted in-depth literature review (Webster; Watson, 2002).

4. Literature Conceptualization Framework

4.1. Conceptualization of Service Classifications

The developed three-dimensional literature conceptualization framework for the literature organization covering heterogeneous service classifications with highly diverse dimensions has a pre-filter function for the literature review conducted. To explain that function, it must be stated that all collected literature is tested, organized, and accepted through this framework, before it is decided to place it as selected relevant literature into the concept matrix to demonstrate current research gaps. Hence, the literature review is grounded on different concepts of service classifications: representations, dimensionality, and scopes. The development of this literature conceptualization framework (see figure 1) is orientated on Klör et al. (2014).

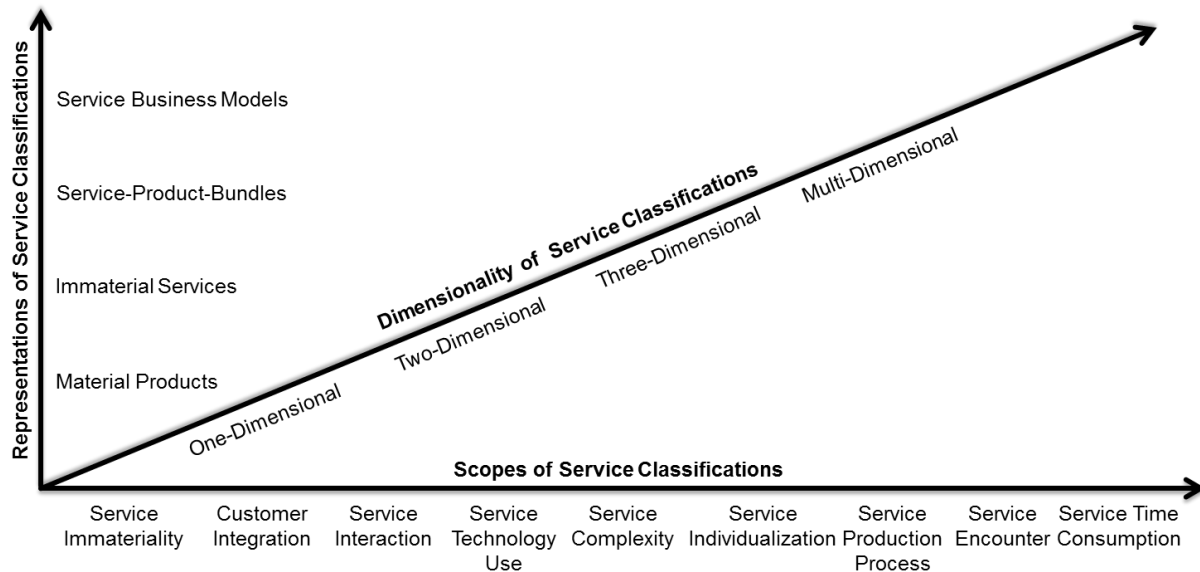


Figure 1. Literature Conceptualization Framework (Based on Klör et. al., 2014).

4.2. Scopes of Service Classifications

First of all, there are a number of heterogeneous service classifications with highly diverse dimensions. Every dimension has its own name and description. That is the reason, why it is so difficult to put all these dimensions together in one concept matrix. Therefore, scopes of service classifications are defined on the basis of the various dimensions of service classifications:

- **Service Immaterially** can be described by the service classification dimensions like: tangibility (Shostack, 1977), intangibility (Bell, 1986), and result dimension: degree of immateriality: material/immaterial (Engelhardt, 1995).
- **Customer Integration** is defined by the service classification dimensions like: customization of the service and necessity of customization (Lovelock, 1983), degree of service customization (Bell, 1986; Haywood-Farmer, 1988), customer disposition to participate (Larsson; Bowen, 1989), and process dimension: degree of integration: integrative/autonomous (Engelhardt, 1995).
- **Service Interaction** is shaped by the service classification dimensions like: degree of fluctuation and interaction between customer and service provider (Lovelock, 1983), degree of interaction: interactive/independent (Engelhardt, 1995), low/high performance ambiguity and goal incongruence/goal congruence (Bowen; Jones, 1986), degree of labour intensity and degree of contact and interaction (Haywood-Farmer, 1988), contact intensity: low/high (Barth et. al., 2000), passive and active contact (Mersha, 1990), and personal (Mills; Margulies, 1980).
- **Service Technology Use** can be formed by the service classification dimensions like: type of connection (Lovelock, 1983), simple/complex technology and mechanistic/organic interface (Haynes, 1990), technology as enabler for employees and customers (Bitner et al., 2000), interface (online/internet) and purpose (customer service) (Meuter et al., 2000), and digitalization of service provision (Meier; Piller, 2001). Service technology use is not only based on the use of information systems, but also on the use of machines during the service production process.
- **Service Complexity** can be constructed by the service classification dimensions like: maintenance, task (Mills; Margulies, 1980), service task (Davis, 1999), service recipient (Lovelock, 1983), service recipients people/things (Hsieh; Chu, 1992), nature of service provision (Lovelock, 1983), high/low complexity (Shostack, 1987), service delivery (Davis, 1999), degree of variation (Schmenner, 2004), and level of input uncertainty (Larsson; Bowen, 1989).
- **Service Individualization** can be assembled by the service classification dimensions like: diversity of variants (Barth et. al., 2000), diversity of demand (Larsson; Bowen, 1989), degree to which the offer is limited and nature of service (Lovelock, 1983), degree of individualization: standardized/customized (Engelhardt, 1995), importance of the individual service from a customer perspective (Meier; Piller, 2001), and low/high divergence (Shostack, 1987).
- **Service Production Process** is described by dimensions of service classifications like: production factors mobile and stationary (Sampson; Snape, 1985), rigid and flexible processes of goods, information, and humans (Wemmerlöv, 1990), and service process structure and service package structure (Kellogg; Nie, 1995).
- **Service Encounter** can be labelled by service classification dimensions like: number of delivery places (Lovelock, 1983), the drivers of service encounter satisfaction meaning customization/flexibility, effective service recovery, and spontaneous delight (Bitner et al., 2000), and use of persons and IT (Leimeister, 2012).
- **Service Time Consumption** is termed by service classification dimensions like: types of utility creation: time utility/space utility (Hsieh; Chu, 1992), time, which is spend at the service encounter differentiated in short (minutes), middle (hours),

and long (days) (Wakefield; Blodgett, 1999), and relative throughput time for a service transaction (Schmenner, 2004).

4.3. Representations of Service Classifications

The third dimension of the developed literature conceptualization framework is specified by the different representations of service classifications:

- **Material Products** are represented in service classifications. Especially early forms of service definitions and classifications tried to separate material products from immaterial services. That is the reason for including material products as an important unit for service classification conceptualization. Bell (1986) represents goods with high materiality and a low degree of adaption. Real physical goods are contained in the service classification of Choi et al. (1997).
- **Immaterial Services** are illustrated in service classifications. As expected nearly all service classifications are demonstrating examples of immaterial services. Bell (1986) represents services with low materiality and a high degree of adaption. Also Schulze (2000) is illustrating immaterial services like supportive-interactive services (software development), problem-orientated-interactive services (insurance), and personal-interactive services (training).
- **Service-Product-Bundles** or hybrid service bundles can be also part of the representation of a service classification. Here, an individual mixture of material products and immaterial services is visualized. To give an example, Leimeister and Glauner (2008) placed hybrid products between material products and immaterial services on the dimensions interaction and immateriality.
- **Service Business Models** are placed in service classifications. One example from Silvestro et al. (1992) is the dimension number of customers processed by a typical unit per day. They are clarifying professional services, the service shop, and mass services. Another example is stated by Mersha (1990) with passive and active customer contact clarifying different kinds of services like data processing services. Besides Schmenner (1986) is differentiating the service factory, service shop, mass service, and professional service by the customer contact. Davis (1999) is also representing service factories, service stores, service shops, and service complexes on two task-orientated dimensions.

4.4. Dimensionality of Service Classifications

Inside the service classifications it is discovered that different service scientists are focusing on different quantities of dimensions. These developed classifications are illustrated by one, two, three, or more dimensions, but mostly by two dimensions:

- **One-Dimensional** means that the service classification consists of one dimension. For instance, Shostack (1977) illustrates different kinds of services on one dimension from tangible dominant (salt) until intangible dominant (teaching). A second example is represented by Chase (1978) with high contact of pure services and low contact of manufacturing.

- **Two-Dimensional** describes a service classification matrix existing of two dimensions. One example is the service classification of Larsson and Bowen (1989) for differentiating the service design by the dimensions of demand diversity and customer participation. The service classification matrix of Doster und Roegner (2000) contains the two dimensions integration and individualization and separates service business models into four quadrants.
- **Three-Dimensional** refers to a service classification that is more detailed because of the three dimensions. Often a service classification matrix is the foundation and extended with a third dimension. For instance, Weiber and Adler (1995) are establishing the three dimensions search attributes, experience attributes, and trust attributes for classification of immaterial services and material products.
- **Multi-Dimensional** explains a complex service classification with more than three dimensions. This complexity occurs during the service classification because of the high amount of service dimensions, which are represented by several different degrees. For instance, Benkenstein and Güthoff (1996) are illustrating the five dimensions individuality, multi personality, length of production episode, and number of partial performances, and heterogeneous of partial performances.

5. Literature Review Results

The literature review results are stated as a service classification research agenda based on the concept matrix from Webster and Watson (2002), which indicates the research gaps in the fields where no cross is made. This concept matrix is grounded on the developed literature conceptualization framework based on Klör et al. (2014) for the organization of the literature detected and presented in table 1.

Table 1. Service Classification Research Agenda.

Used for Classification	Concepts of Service Classifications																
	Scopes									Representation				Dimensionality			
Units of Analysis	Service Immateriality	Customer Integration	Service Interaction	Service Technology Use	Service Complexity	Service Individualization	Service Production Process	Service Encounter	Service Time Consumption	Material Products	Immaterial Services	Service-Product-Bundles	Service Business Models	One-Dimensional	Two-Dimensional	Three-Dimensional	Multi-Dimensional
Judd (1964)	X		X							X	X					X	
Rathmell (1966)	X						X	X	X	X	X	X	X	X			
Shostack (1977)	X									X	X		X	X			
Hill (1977)			X			X					X				X		

Browning; Single- mann (1978)					X						X			X			
Chase (1978)		X	X				X	X	X		X		X	X			
Thomas (1978)			X			X	X				X				X		
Mills; Margulies (1980)		X	X		X				X		X					X	
Grove; Fisk (1983)			X		X						X			X	X		
Lovelock (1983)	X	X	X		X	X	X	X			X				X		
Sampson; Snape (1985)		X					X				X				X		
Silpakit; Fisk (1985)		X	X				X				X			X	X		
Bell (1986)	X	X								X	X	X			X		
Bowen; Jones (1986)			X										X		X		
Schmen- ner (1986)		X	X		X						X		X		X		
Shostack (1987)					X	X	X				X				X		
Haywood- Farmer (1988)		X	X				X				X					X	
Larsson; Bowen (1989)		X			X	X	X				X		X			X	
Chase; Aquilano (1989)		X	X				X				X					X	
Bowen (1990)		X	X			X					X			X			
Bitner (1990)		X						X			X			X			
Haynes (1990)			X	X			X		X		X				X		
Mersha (1990)			X								X				X		
Wemmer- löv (1990)			X				X				X				X		
Bitner (1992)		X	X					X			X			X			

Hsieh; Chu (1992)		X						X	X		X		X		X		
Silvestro et al. (1992)		X	X			X	X	X	X		X		X		X		
Engel- hardt et al. (1993)	X	X	X			X	X			X	X				X		
Kellogg; Nie (1995)					X		X				X		X		X		
Mößlang (1995)			X	X	X						X				X		
Patter- son; Cicic (1995)	X	X	X			X					X	X			X		
Weiber; Adler (1995)	X				X					X	X					X	
Benken- stein; Güthoff (1996)			X		X	X	X				X						X
Wake- field; Blodgett (1996)								X	X		X			X			
Woratsch ek (1996)	X	X				X					X					X	
Bufka (1997)	X	X								X	X				X		
Choi et al. (1997)				X						X						X	
Corsten (1997)	X	X	X	X							X				X		
Davis (1999)		X			X		X				X		X		X		
Wake- field; Blodgett (1999)							X	X	X		X				X		
Bitner et al. (2000)		X	X	X				X			X				X		
Corsten (2000)		X	X								X				X		
Doster; Roegner (2000)		X				X							X		X		
Meuter et al. (2000)				X							X				X		
Schulze (2000)			X			X	X				X				X		

Bruhn; Meffert (2001)		X	X	X	X	X	X				X		X		X		
Meier; Piller (2001)		X		X		X	X				X		X		X		
Spath; Demuß (2003)		X	X							X	X	X		X			
Schmen- ner (2004)		X	X		X	X			X		X		X		X		
Breit- haupt (2005)	X	X	X	X	X	X	X		X		X			X	X		
Meier et al. (2005)	X									X	X	X		X			
Meffert; Bruhn (2006)	X	X	X	X	X	X	X				X			X	X	X	
Büttgen (2007)		X	X								X				X		
Kollmann (2007)				X	X					X	X					X	
Leimeis- ter; Glau- ner (2008)	X	X	X			X	X			X	X	X			X		
Chase (2010)			X								X		X	X			
Clement; Schreiber (2010)	X			X	X					X	X			X	X		
Backhaus et al. (2010)	X	X			X	X				X	X	X	X	X			
Becker et al. (2011)					X	X					X			X	X		
Ihlenburg (2012)		X	X	X							X			X			
Leimeis- ter (2012)			X	X							X		X		X		
Salegna; Fazel (2013)	X	X	X								X				X		
Total	18	35	37	14	20	21	24	10	10	14	59	7	17	19	39	10	1

6. Discussion of the Literature Review Results

6.1. Limitations of the Literature Review Results

The boundaries of the in-depth literature review conducted and its application is outlined by other or further dimensions of the literature conceptualization framework, use of a keyword string, and missing double-blind review process.

First, there can be other or further dimensions of the literature conceptualization framework. For instance, there might be more representations or scopes of service classifications like service use behaviour of customers. On the other hand, the concepts are well-grounded based on the dimensions and illustrations of the service classifications. Hence, the developed framework is a methodical background for realising and structuring an in-depth literature review of service classifications by other researchers.

Second, the use of a keyword string in the literature review is neglected like Klör et. al. (2014) did. However, a set of keywords with different keywords and synonyms of keywords in a keyword search is applied. The search result is not only keyword literature, because the life circle of the keywords specified in keyword changes is also observed. Over the decades published articles from different authors established diverse keywords with the same and changed meanings. The forward and backward search aided not to miss relevant service classification literature.

Finally, no double-blind review process during the literature integration in the concept matrix is conducted. First, it is not explicit recommended (vom Brocke et. al., 2009). Otherwise, it is not explicit necessary, because the dimensions and illustrations of service classifications are observed. These are transferred into the concepts of service classifications with the aid of the literature conceptualization framework.

6.2. Implications of the Literature Review Results

Starting in the 1960s service classifications are one- and three-dimensional, material products and immaterial services are represented by concentrating on the scope service immateriality.

Later, in the 1970s one and two dimensions, immaterial services and service business models, and the scopes service interaction, service individualization, and service production process are in the discussion of service science researchers.

From 1980 the research of service classifications became famous in service science. Here, the researchers focused on two-dimensional service classifications for the positioning of immaterial services while applying the scopes customer integration, service interaction, service complexity, and service production process.

This growth of conducted service classification research increased to its top in the 1990s. Service scientists are concentrating on two dimensional service classifications, highlighting immaterial services and service business models, using the scopes service immateriality, customer integration, service interaction, service individualization, service production process, and the service encounter.

Since the year 2000 service classification research seems to be decreasing. Nonetheless, two dimensional service classifications are established to demonstrate material products, immaterial services, and service business models covering the scopes customer integration, service interaction, service technology use, service individualization, and service production process.

Service classification research since 2010 focused on one and two dimensions, the representation of immaterial services and service business models, the scopes service immateriality, customer integration, service interaction, service technology use, and service complexity.

Based on this conceptual foundation in the realized in-depth literature review the analysis of the concept matrix visualizes the needed further research as a meaningful service classification research agenda (see table 1) of open research gaps. The in-depth literature review conducted validates understandable the time based development of the open and closed research gaps. Further research must close the current research gaps. Service classification development is realized on a conceptual level first and then with the aid of an empirical foundation. Service classification researchers must reflect the scopes service technology use, service encounter, and service time consumption and represent service-product-bundles or hybrid service bundles with a three- or better multi-dimensional visualization.

7. Outlook

New service scripts (Schank;Abelson, 1977) or service business models especially for service implementation in the market can be planned on the foundation of the literature conceptualization framework. Chances, risks, strengths and weaknesses are visible, if the scopes of service classifications are reflected in the business plan or service script. Just think on a new restaurant service script, where exclusive food is served (service individualisation), where you can order your meal with a tablet computer installed at the table (service technology use), where the customer sees the open kitchen (service immateriality), where he can interact over the tablet computer for example to ask other guests how their food tastes (service interaction), where they can pay online with the tablet computer (customer integration), and where they get food suggestions on the tablet computer (service complexity).

Service modelling languages can be developed or enhanced concerning the contributions of this in-depth literature review. The established literature conceptualization framework aids to develop a modelling language for service engineering. This service modelling language can exist of three levels: service classification level, service conception level, and service blueprinting level. The first service classification level is grounded on a service classification framework, which orders the representations by dimensionality and scopes. The second service conception level is then described by e. g. service scripts or service business models based on the concepts applied during the service classification development: scopes, dimensionality, and representations. The third service blueprinting level details information about the service process by using service modelling languages like blueprinting for service process modelling. This service modelling language with its three levels can be applied for the digitalization of services, modelling the service episodes, customer contact points and service process activities of both the customer and service provider. The per-

ceived service quality as a result of the customer comparison between expected and perceived service can also be enhanced, because the determinants of service quality like access, communication, competence, courtesy, credibility, reliability, responsiveness, security, tangibles, and customer understanding and knowing can be positive influenced (Parasuraman et al., 1985) by the service modelling language specified.

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J4: Innovative tools

Chair: Marie-Christine Monnoyer

Know Your Customers: Developing Innovative Services to Enhance Acceptance of Electric Vehicles

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The field of electric mobility is characterised by numerous business opportunities for companies from different industries. At the same time, there is still a lack of acceptance of electric vehicles on the part of (potential) users. Smart business models and user-friendly services hold the potential to balance the real and perceived drawbacks of electric mobility to make it suitable for everyday use. This paper presents the results of empirical research into the importance of services for achieving market acceptance of electric mobility. Furthermore, it presents a first version of a user-centric, agile Service Engineering reference model that is based on the empirical findings and directly aimed at developing user-friendly services for electric mobility.

1. Motivation

Electrically powered vehicles—including but not limited to electric cars, e-bikes, e-scooters, buses and lorries—are still undergoing a process of rapid technological development. Other related issues, such as the standardisation of charging technology and autonomous vehicles that navigate automatically to charging points, are in the focus of numerous research and development activities worldwide. At the same time, however, suppliers are facing a considerable marketing issue, since electric vehicles do not yet meet with sufficient acceptance in the market. Nevertheless this consideration is only one side of the coin reflecting a typical dilemma between supply and demand: potential users are supposed to adopt the new mobility concept—but do not find the wide-area infrastructure necessary to make the use or even purchase of electric vehicles useful and attractive in the first place. The activities of the presented findings are based on a German research project: DELFIN (German acronym for “services for e-mobility—fostering innovation and user-friendliness”). Germany is an interesting case for researching the acceptance of electric vehicles: until now, the focus here has been on technological development, which means that the technical conditions are overall quite positive. But at the same time, acceptance of electric mobility (also: e-mobility) in the population seems to be comparably low—at least according to the sales figures: there are 23,611 pure-electric cars and 123,767 hybrids (incl. plug-in hybrids) on German roads (as of 1 July 2015; calculated by KBA, 2015). This is equal to around 0.29% (pure-electric) and 0.99% (hybrid) respectively of total new car registrations in 2015. Diesel- and petrol-fuelled cars together represent around 98.33% of new car registrations in 2015 so far (1 January to 30 June).

2. Objectives and methodology

To address the lack of acceptance, to explore the potential of services for achieving acceptance of electric mobility, and to define an approach that delivers innovative e-mobility services systematically, the research work underlying this article is based on the following main objectives:

- To investigate the role of services in supporting the diffusion process of electric mobility in the market
- To analyse and explore how services help to improve the user-friendliness of electric mobility, in order to achieve better acceptance in the market
- To find a practical solution for implementing user orientation in the process of developing new services in the field of electric mobility

To achieve the abovementioned objectives, the following steps are being completed (cf. Fig. 1): comprehensive analysis (A1 to A3); development of an innovation model for creating e-mobility services systematically (Service Engineering reference model), including easy-to-use guidelines (D1 to D3); and transfer of the results to practitioners (T), including an optional loop to revise the innovation model according to practitioners' feedback.

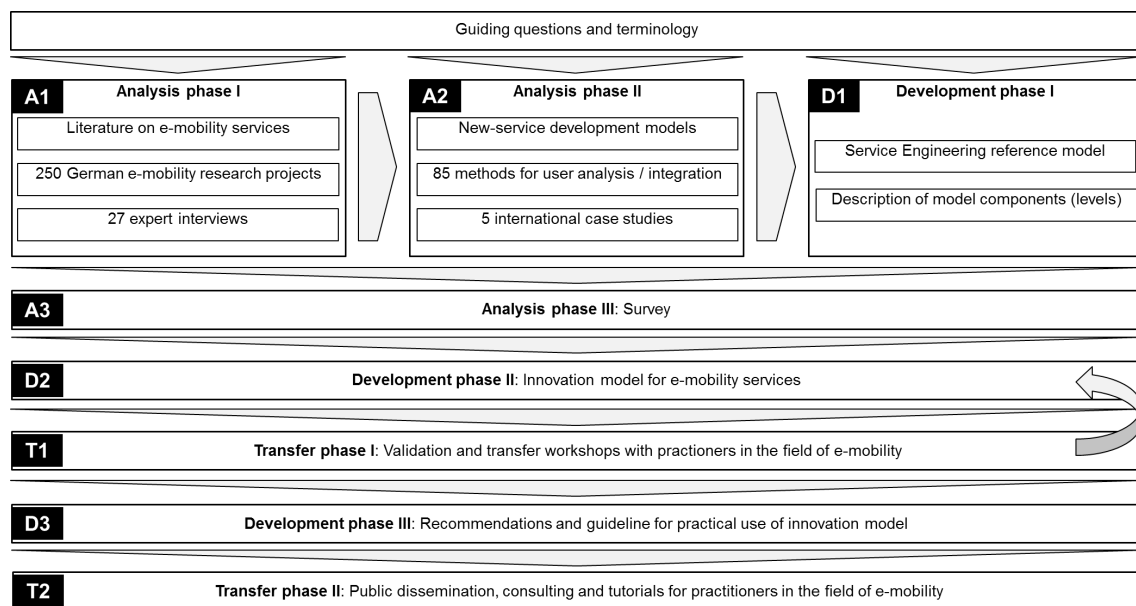


Fig. 1: Methodology

Analysis phases

(A1) First, a comprehensive research on **250 publicly funded projects** in the field of electric mobility in Germany was conducted in order to get an overview of those services that are implicitly as well as explicitly required to support the dissemination of electric mobility over and above technical progress. Based on these first findings,

27 expert interviews with professionals from scientific research and companies of different sizes were conducted in order to discuss the findings from the previous projects analysis and to get an idea of the importance of services for the diffusion of e-mobility offerings in different application fields (e.g. public transport, individual mobility, corporate fleets).

(A2) Second, research on existing **models for developing new services** was conducted in order to detect recent trends and white spots. Then a comprehensive analysis of **85 methods** for user analysis and user integration was carried out, covering different disciplines such as new product development, software development, and new service development (NSD). The methods were classified either as methods for user analysis or as methods for user integration (“co-creation”). Each of the methods was evaluated to determine the phase of NSD in which it is applicable. In addition, **international case studies** are being conducted (ongoing) to find examples of good practice as to how services are used to support the implementation of e-mobility offerings in the market. There is a specific focus on how users are integrated along the whole process of NSD, and what methods of user analysis and user integration are particularly effective. The results will be used to state which methods are the most suitable, as well as to identify white spots with regard to new methods or combinations of methods.

(A3) Third, a **survey** among e-mobility users and providers will be conducted in order to validate the findings so far and to generate additional information for the Service Engineering reference model to be developed. The results of the survey are not available yet but are expected to be published in the first half of 2016.

Development phases

(D1) Based on analysis phases (A1) and (A2), a **Service Engineering reference model** for creating e-mobility services will be developed.

(D2) Based on the feedback of the survey (A2), this model will be further developed into a more comprehensive **innovation model**. For instance, upstream processes such as strategy development and idea generation will be added and connected with the core development process of a service.

(D3) As a third step, the practically validated innovation model will be enriched by a **guideline** and specific **recommendations for practitioners** so that it will be applicable and useful for companies in e-mobility business.

Transfer phases

(T1) To ensure dissemination of the innovation model and to collect feedback from practitioners, it will be presented and discussed with experts from science and business. This step also allows for a loop to phase D2 to make sure that the final innovation model will be in line with practitioners’ needs.

(T2) The innovation model for e-mobility services including recommendations and a guideline for its practical use will be published as a final version and distributed in print format as well as digitally. Furthermore, there will be tutorials and workshops as well as individual consulting offerings for e-mobility practitioners.

3. Developing user-friendly e-mobility services: A systematic approach

First in this section, findings from the analysis phases are presented and summarised (section 3.1.). After that, conceptual considerations about how to address the findings using a reference model for developing e-mobility services will be described (section 3.2.).

3.1. Developing services for electric mobility—analysis results

Analysis phase 1 (A1):

Characteristics and requirements concerning electric mobility

Characteristics of the e-mobility market

The main perceived **drawbacks of electric mobility** include long charging times, high prices (in comparison to cars with an internal-combustion engine), limited range and a still inadequate charging system, to name just the most common ones from recent studies and the daily press (cf. Kolz; Schwarz, 2015). But owners or regular users of electric vehicles perceive **advantages** as well. The most important benefits seen in electric mobility in general, and in buying an electric vehicle, are ecological advantages and driving pleasure. In a recently published study, the owners of electric vehicles surveyed say they are satisfied after purchase and would recommend buying an electric vehicle to others (Frenzel et al., 2015). Still, the owners of electric vehicles, in particular electric cars, are considered “early adopters” in Germany.

The analysis of 250 publicly funded German research projects led to the conclusion that research and development (R&D) activities are mostly focused on the **technical aspects of electric mobility**, with the exception of the “Service Innovations for Electric Mobility” funding priority established by the German Federal Ministry of Education and Research (BMBF) at the end of 2013 in order to close this gap and the “Showcase Regions” (Schaufenster Elektromobilität, 2015), which include service issues within a living lab approach. In sum, the main target in R&D so far has been to develop and produce electric vehicles, batteries and charging solutions that are technically competitive with petrol- and diesel-fuelled vehicles and the well-established, dense network of service stations that has evolved steadily over several decades. At the same time, in the context of electric mobility, research into services and business models is relatively uncharted territory in comparison to the leverage effect they offer in terms of acceptance and commercialisation.

Role of services in the e-mobility market

A different approach is to ask how to integrate electric vehicles into people’s mobility behaviour in their private and professional life, and what services and business models could help to make it easier and more appealing for users to adopt electric vehicles. Assuming a **service-dominant view** implies that services are the frame of an offering within which a technical product (here: electric vehicles, charging systems, etc.) is used or embedded (e.g. car sharing, public transport) or that refers to a technical product (e.g. repair, maintenance).

The results of the 27 expert interviews show that the field of mobility in general and electric mobility in particular is characterised by numerous factors and developments that lead to new business opportunities on the one hand and uncertainty on the other hand:

- **New services and business models are emerging due to new market constellations** (cf. Cocca; Klemisch; Meiren, 2015):
Roles are changing, because new (start-ups) and existing market players (e.g. large energy suppliers, car manufacturers) are mingling; structures (e.g. value chains and value networks) are in flux; and companies thus may rethink their strategy and portfolio fundamentally. Furthermore, the role of customers in business models is changing (e.g. prosumers, sharing), which leads to a shift in the relationship between service provider and consumer in contrast to traditional service models.
- **Service networks** (cooperation) and **IT support** (digitalisation) are gaining in importance (cf. Hottum; Kühl; Stryja, 2015):
Industries previously alien to each other may be even forced to cooperate to offer integrated services (e.g. energy and automotive), and there is a need for supporting IT platforms to facilitate cooperation and to deliver the services to customers.

In this context, the **relevance of services is seen as “high to very high”** for the acceptance and hence dissemination of electric mobility in the market (cf. Kolz; Schwarz, 2015). Services can tackle two issues in order to foster electric mobility most effectively. First, they can support the functioning of the system, for example comprehensive charging services that make it possible for users to use electric cars according to their needs, or a comprehensive repair and maintenance network that is comparable to the service network for petrol- and diesel-fuelled cars. Second, the potential for user delight should be thought of in the context of electric mobility and systematically engineered into e-mobility-related services (Cocca; Klemisch; Meiren, 2015).

Main findings from A1:

- Services hold considerable potential for achieving acceptance of electric mobility in the market, but they are still underestimated and not developed systematically in business practice, and they are still given insufficient consideration compared to technical R&D.
- New services in a highly dynamic market such as (electric) mobility may be linked with fundamental strategic decisions. Innovation in the field of e-mobility services should therefore include the development of a clear strategy beforehand.
- Services for electric mobility are often based on new business models, in particular concerning new cooperation constellations (cooperative service networks) and IT support (digitalised services, digitalised business models). For this reason, it is important first to explicitly describe the business model before starting to design the associated service(s).

- Systematically designing a user experience that supports the acceptance of electric mobility is crucial, and services offer the opportunity to bridge the gap between technological solutions to (potential) users.

Analysis phase 2 (A2):

User analysis and user integration in new service development

User-centric design, co-creation and agility

To create user-friendly e-mobility services efficiently and effectively, suitable innovation approaches and new-service development processes are required. Integrating stakeholders into service development, and in particular **user or customer co-creation**, is a key trend in service research (cf. e.g., Toivonen, 2014; Fischbacher, 2005). Here, the principle of *customisation* is brought one step further: “*The difference between ‘co-creation’ and ‘customisation’ lies in the degree of involvement of the customer; in general terms, the customer plays a less active role in customisation than in co-creation. [...] In contrast, co-creation refers to the involvement of the customer as an active collaborator right from the beginning of the innovation process.*” (Kristensson; Matthing; Johansson, 2008, p. 475). In software development, the shift towards stronger user and customer integration occurred with the beginning of **agile approaches** and the emergence of **user-centric design**, which are now being combined with each other. The motivation behind agile development is to focus on the people involved and their interactions rather than clinging to processes and tools (Blomkvist, 2005; Chamberlain; Sharp; Maiden, 2006). In 2001 the *Agile Manifesto* was established, promoting “*better ways of developing software*” (Beck et al., 2001) based on the following fundamental principles: to value *Individuals and interactions* (over processes and tools), *Working software* (over comprehensive documentation), *Customer collaboration* (over contract negotiation), and *Responding to change* (over following a plan). Since then, numerous agile methods for software development have started to emerge (cf. Moniruzzaman; Hossain, 2013).

Generally, an agile approach and user-centric design seem to be suitable in the field of e-mobility services, assuming the abovementioned characteristics of the market context (see A1), because it puts the focus on involving the targeted users directly in the design process of a service, allowing even fast-changing requirements to be considered. As to the lack of acceptance of electric mobility in the market, it is important to facilitate the integration of (service) users from the very beginning of the development process and to head towards a more experimental approach—as is the idea in prototyping. Currently available NSD approaches seem to contrast strongly with the idea of agility and user-centric design—despite the fact that there are quite a lot of substantiated and widely accepted models. *Meiren et al.* (2015) have compared selected process models for NSD, as shown in figure 2. The researchers’ main finding is that NSD models follow linear processes, with the implicit claim that the approaches fit all types of services and—in contrast to iterative approaches—that the requirements do not change or that no new requirements will pop up during the development process, whether on the part of customers, through frame conditions

(e.g. political, legal, economic), in relation to internal demands (e.g. change in strategy, reorganisation), or simply from feedback during testing.

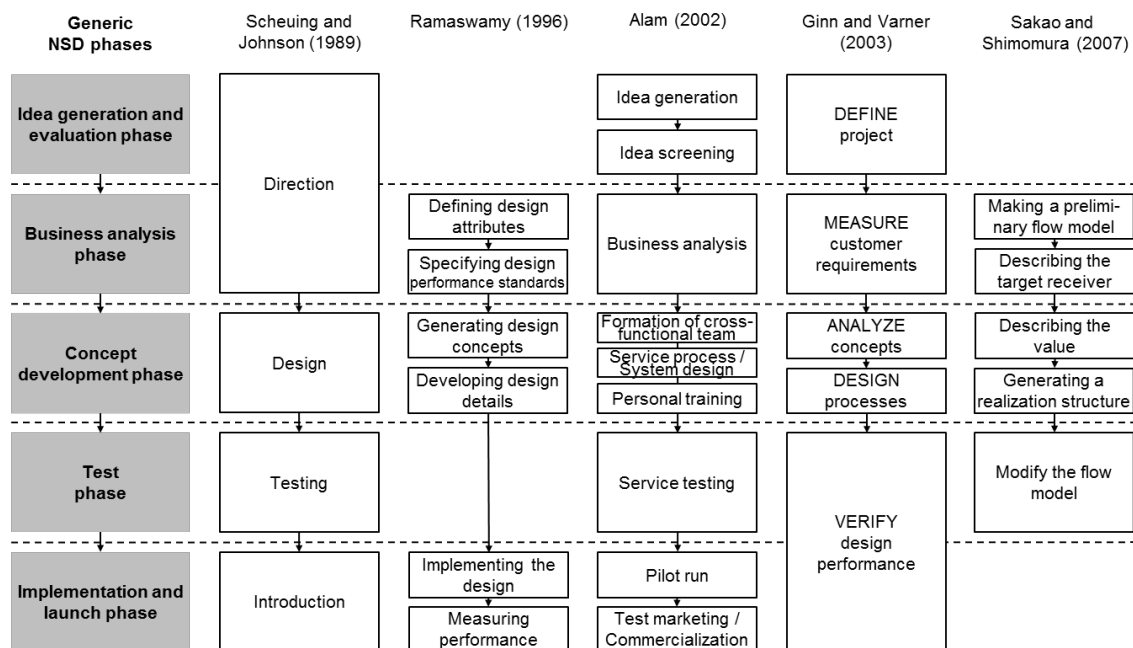


Fig. 2: Comparison of selected process models for new service development (Meiren et al., 2015)

But why would it make sense to use agile approaches for NSD as well? *Ojasalo and Ojasalo* (2015) have proposed a model of *Lean Service Development* that takes into account the need for stronger user orientation and focuses on learning cycles and rapid prototyping. This could be seen as a starting trend in the service research community. But from the practical side as well, a need for agile NSD approaches can be derived: applying sequential approaches in business practice indeed leads to intuitive modifications to process-activity models during development. As shown in (Cocca; Franke; Schell, 2015), a service developer facing uncertain market situations, high interdisciplinarity, and a highly specialised field of services (e.g. consulting) will tend to develop service “prototypes”, discuss and test them with customers, and generally make several iterations between the development phases. This means that there might be pre-defined processes and activities, but in practice the approach would be applied and modified by individuals, all happening in interactive processes.

For the field of electric mobility—with many different types of services, the need to integrate users, and high market dynamics—linear approaches seem to be outdated. Furthermore, as many service types in the field of electric mobility are based on IT platforms and related software, a convergence of NSD with software development approaches seems to be sensible.

Methods for user-centric design

Besides the question of *how* users can be integrated into new-service development processes (methods and tools), the question of *where* or *when* in the development

process to integrate them should be addressed. The initial target is to include the user perspective as comprehensively as possible within the innovation process. Thus, different types of methods for user analysis or user integration should be used, covering the development phases as thoroughly as possible (cf. Cocca; Klemisch; Meiren, 2015). To this end, research on **methods** that focus on users or customers within development processes was carried out. The methods were collected and categorised according to a 3-level maturity model of customer integration, as shown in figure 3, and according to their applicability in different stages of the NSD process. The maturity model used is based on previous research work about how companies view their customers when developing new services (Nägele; Vossen, 2006). The five levels foreseen in the original approach have been reduced to three: the user as the *point of perspective* in the development process, the user as an *information provider*, and the user as *co-designer*. The original model additionally included the lowest level “customer as consumer” and the highest level “customer as partner”. For the current research, the lowest level has been omitted because no user-centric methods are used there, so it does not contribute to the target. The highest level considers customers as partners, pointing to a sustainable co-creation relationship. For the development process of services, there is no difference between this level and the level of “customer as co-designer” in terms of the methods applied. To avoid redundancy, this level has been excluded as well. The first and lowest level understands **users as the point of perspective** assumed for developing a service. It describes the situation in which a company does not directly ask or gather any information from service users about their needs and requirements concerning the service to be developed. To achieve user-oriented offerings though, the service developers assume the perspective of users in an analytical approach and by deductive reasoning. Methods such as cognitive walkthrough, internal expert workshops or actors maps are suitable methods to be used for this purpose, e.g. to pre-structure the context of the service and its users. The second level represents **users as information providers**. It includes traditional methods of market research used by companies, such as surveys, customer workshops or eye tracking, but also findings from complaint analyses or data collected via customer relationship management (CRM) tools. The third and highest level of customer integration in the development process sees **users as co-designers**. It considers customers or users as partners within development projects. Well-known methods in this category are user stories, idea competitions or living labs. In contrast to the other two categories in which the focus is solely on user *analysis*, the main purpose here is user *integration*. The higher the chosen level, the higher the degree of customer orientation.



Fig. 3: Structuring approach for methods analysis

So far it has been possible to compile a raw list of 85 common key words representing methods in the wider sense (incl. approaches, concepts and tool-like methods) and classify them along this structuring approach. Some of the key words represent methods that refer to or use other methods in combination or that subsume methods on another level of abstraction. As the main aim is to finally come up with a selected list of applicable methods for practitioners, the methods research should not lead to an exhaustive, disjunctive database, but rather to a collection of methods to choose from in the transition from the developing phase of the research project to the validation and transfer phase with practitioners. The following table gives an overview of the number of methods in each category:

Role of users in the development process	Number of methods (common key words) found
Co-designer	33
Information provider	31
Point of perspective	21
<i>Total:</i>	<i>85</i>

Table 1: Numbers of methods collected and categorised for user analysis and integration

Main findings from A2:

- Traditional NSD models follow a sequential routine. In comparison to the needs of a more dynamic and user-centric design context in the field of e-mobility services, this appears to be outdated. This means an agile and user-centric approach is required.
- To achieve market acceptance for new technologies and the (service) business models in which they are embedded, users need to be integrated stringently into the development processes. To this end, methods and tools for thorough user analysis and user integration should be provided in a standardised way and along the whole development process—clearly assigned to development phases and subordinate steps. The degree of user orientation of the methods may vary. They might treat users and/or customers as the point of perspective, as information providers, or as co-designers.
- There needs to be a review of whether there is a requirement for new methods or new combinations of existing methods for user orientation (white spot analysis concerning methods for user analysis and user integration, as well as for agile project management methods).

3.2. Service Engineering reference model for electric mobility

The core element of the innovation model for e-mobility services is a *Service Engineering reference model* including a process-activity model for developing services systematically, emphasising thorough user analysis and integration, and providing a flexible, configurable approach.

Requirements regarding the Service Engineering reference model

From the main findings of the analysis phases, more specific requirements regarding the reference model were derived:

- The Service Engineering reference model should support service innovation in the field of electric mobility and guide practitioners systematically through the development process. This means that it should focus on the actual development process, but it should also be linked with upstream steps such as strategy finding and idea management. As an innovation is achieved only when a service has been successfully realised in the market (cf. Schumpeter, 1912), the reference model should also include market launch as a major step. Furthermore, to offer commercialisation opportunities for technical e-mobility solutions, the reference model should include business model generation as a major step at the outset.
- As the market for electric mobility is not yet established, with new business opportunities still emerging and e-mobility providers still facing a lack of acceptance in the market, the Service Engineering reference model should support the integration of relevant stakeholders, of which the most important are the (potential) users and/or customers.
- In view of the required focus on interaction within the innovation process and in particular within the core development process of a specific service, the Service Engineering reference model should follow an agile approach.
- Despite the fact that the Service Engineering reference model must be generic enough to cover all e-mobility services, at the same time it should be specific enough to guide practitioners through the development process. As a solution for this dilemma, the reference model should be built up in a modular way and it should be easily configurable.
- To support practical applicability, the Service Engineering reference model should provide not only a clear process-activity model, roles and recommendations, but also a set of methods and tools—in particular regarding user analysis and user integration.
- The model should refrain from too high a degree of formalisation, in order to stay aligned with the idea of agility; and it should feature recommendations for agile project management to support people involved and interactions.

Conceptual considerations for the Service Engineering reference model

The Service Engineering reference model includes six components, with each superordinate level passing on its characteristics and influencing the subordinate level(s) (see figure 4). This framework will be filled to achieve a comprehensive

innovation model for e-mobility services. To deliver support for practitioners, the reference model will be provided together with a guideline for companies that intend to develop and offer services in the field of e-mobility, and it will be complemented by workshops and consulting.

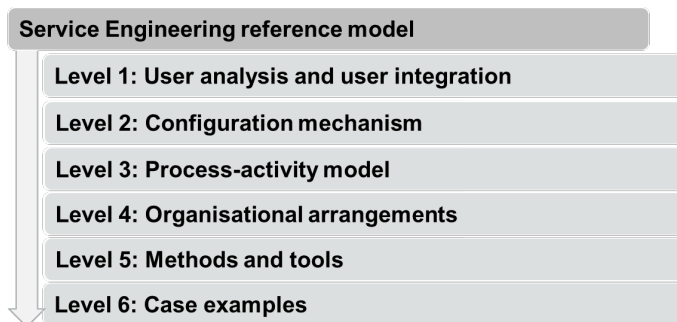


Fig. 4: Components of the Service Engineering reference model

The current stage of the reference model is conceptual and the interim results so far will be described in the following paragraphs.

Level 1: User analysis and user integration

In the level of user analysis and user integration, the model gives recommendations of where and how users are analysed and integrated. Thus, it “passes” its characteristics and findings to the levels below. Three types of addressees of a service are distinguished in the model, encompassing private (“business-to-consumer” perspective) as well as corporate customers (“business-to-business” perspective): the (end-) **user** of an e-mobility service, the **purchaser**, and the (internal or external) **contractor** of the developing project. In reality, they can be identical persons or groups. In the innovation model, the customer types are defined as follows: the user is the person who actually *gets in touch* with the e-mobility services, no matter if this happens intentionally or incidentally, and thus the term encompasses potential users as well. The purchaser is a person who *pays* for an e-mobility service. The contractor here is defined as the project initiator; this could be an internal stakeholder (e.g. corporate management, business development), or an external stakeholder (e.g. customer of a service consulting project), bringing their own requirements and expectations into the development process. In fact, the latter type is no “customer” of the service to be delivered, but is to be integrated into the innovation process. The distinction between user analysis and integration helps to define the degree of co-creation to choose, according to figure 3. It is important to note that a higher level (full integration) is not necessarily better than a lower level (e.g., analytical approaches with low or no activity on the side of the users). The idea is to combine analytical-empirical approaches with approaches of co-creation with users, customers (and, if necessary contractors) in an effective way; e.g., starting with user analysis and refining the findings by choosing and integrating users accordingly.

Level 2: Configuration mechanism

In developing the innovation model, one of the most striking challenges is to find a balance between generality (so the model can apply to all types of e-mobility services), and detail (so practitioners can be guided through the innovation process). To adapt the model to the context and complexity of the development project, a configuration mechanism is defined. The aim is to reflect the heterogeneity and the different degree of complexity of e-mobility services. In particular, the configuration mechanism is intended to support the modular modification of the process activity model (level 3). For this, a system of characteristics and a modular concept is developed. The result will be an easy process chart that will help the user of the innovation model to decide which variant, i.e. which modules to follow (“self-test”). The decision points will be based on **guiding questions** that help to categorise the service that is to be developed (service type), and to understand the effects on the process-activity model, the methods and tools to be used, and so on. Based on the result of the self-test, the developer is able to configure the innovation model according to the service type in an easy way. So far, relevant guiding questions have been collected and categorised and the effects of their parameter values investigated. The idea is illustrated in figure 5. The guiding questions are currently being developed in an experimental group process, and will also be part of the validation process (T1, figure 1).

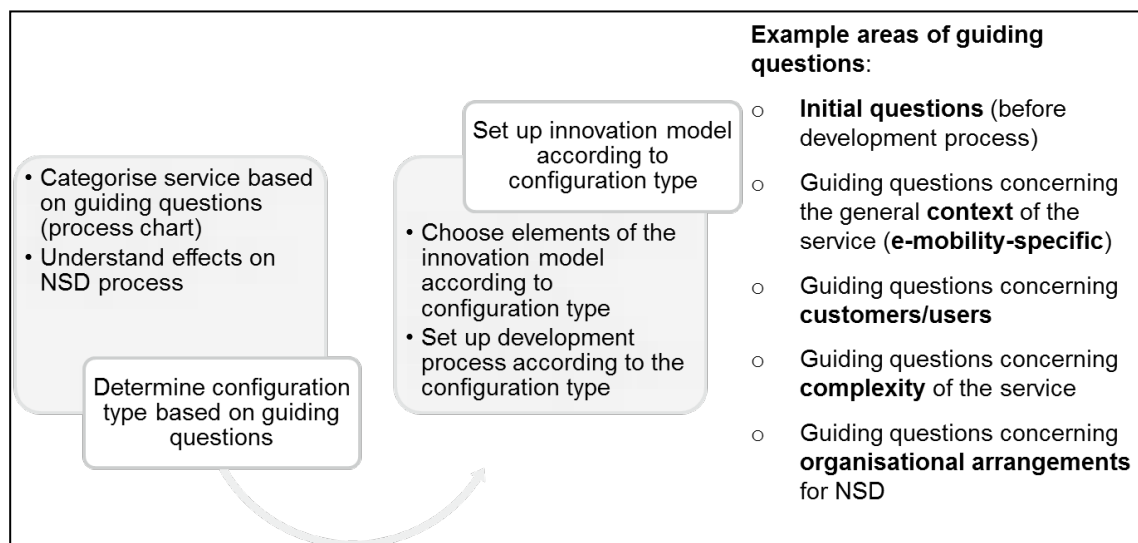


Fig. 5: Configuration principle for the innovation model based on guiding questions

Level 3: Process-activity model

The process-activity model describes how a service is developed practically, which main phases are to be walked through, which single steps and tasks are part of the phases, and how single steps are linked (e.g. loops, interfaces, decision points). It represents the core of the reference model when it comes to practical application in an NSD context.

The following requirements for the process-activity model were defined, based on the previous analysis phase:

- Building upon and further developing the systematic approaches of Service Engineering
- Linking service description, process modelling and resource planning—as well as the marketing concept developed in parallel—to the previous step of business model development
- Mapping the user perspective as accurately as possible throughout the development process, and translating user, customer (and, if required, contractor) needs as exactly as possible into service functionalities
- Agile development approach, with a focus on testing and feedback, prototyping, and using short, iterative development cycles; refraining from too high a degree of formalisation (cf. agile manifesto; shift to support from level 4: agile project management and interactions).
- Applicability to all different kinds of services in the field of electric mobility, thus configurable
- Intuitive comprehensibility and practicability, i.e. easy to use for small and medium-sized companies that often do not have professionalised service innovation departments and/or service R&D departments

The process-activity model will be divided into two main parts. The core is represented by the main development phases and areas of activity, including single and multiple **iterations** (loops), and decision points: *requirements analysis*, *design*, *testing*, *implementation*, and market launch. Recommendations and decision support concerning *strategy finding* and *idea generation* for e-mobility services will be inserted as a preceding block, accompanying the innovation process. The final process-activity model will be cyclic, which means that after the market launch the process begins again by rethinking strategy and continuously generating ideas (e.g. collecting ideas from customer feedback, competitors, employees), or by reacting to changing requirements.

Service testing is emphasised within the design phase. Currently, three testing iterations are considered, depending on the complexity of the e-mobility service: concept test (iterations, drafting and versioning), lab test (e.g. simulations using virtual reality and business theatre), and market test (piloting, user and customer feedback).

Level 4: Organisational arrangements

The systematic development of services remains uncharted territory for most technology-based companies. Often there are no specialised units within the company to take on this task, or no clearly defined responsibilities (Schäfer, 2014; Meiren, 2006). For this reason, the Service Engineering reference model includes a fourth level dedicated to organisational arrangements, mainly organisational structures, and roles and responsibilities. Furthermore, rethinking service development approaches to move them from formalisation and linearity towards

interaction and agility necessarily leads to modifications in organisational structures, as well as in roles and responsibilities. Thus, a model that includes explicit roles such as user, customer, (contractor), service development team, management, and agile roles taken from the *Scrum* method is being developed in the DELFIN project.

Level 5: Methods and tools

The main objective of this level is to provide practitioners with concrete methods and tools to be used along the process-activity model (level 3) and to support agile project management (level 4). The focus is set on methods and tools for user analysis and user integration, to avoid the risk of user acceptance lacking before market launch by ensuring an early alignment with users' and customers' needs. The catalogue to choose from will be compiled from the methods research and complemented by suitable tools (templates, checklists, software etc.).

Level 6: Case examples

To illustrate levels 1 to 5 and support applicability of the reference model to business practice, it will be accompanied by case examples, with step-by-step explanations.

4. Summary and conclusion

The markets emerging around electric mobility hold considerable potential for new business models and new players as well as for new cooperation constellations between companies from different industries. Vastly uncharted, dynamic market territories confront companies with risks, but at the same time are attractive for pioneers. User-friendly services offer lucrative opportunities for pioneers because they can support the market success of electric mobility effectively, but they are as yet underestimated and not developed systematically in business practice, and they are still given insufficient consideration compared to technical R&D. As to applied NSD, user integration is crucial, because potential customers are still reluctant about electric mobility due to fragmentary infrastructure and a lack of experience. This means that the market success of e-mobility services is subject to the condition that users are considered and integrated during the whole innovation process. No suitable development approach has yet been found that systematically addresses and makes use of user-friendly services in the field of electric mobility.

This article and the underlying research work are intended to address this gap in the field of service research and to make use of the potential of services to foster electric mobility. The first steps towards a user-centric, agile Service Engineering reference model have been finished, and will be followed up towards a comprehensive innovation model including recommendations and guidelines for its use.

5. Acknowledgements

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 - 3.2. Animation et innovation
4. Deux cas d'animation de processus d'innovation
 - 4.1. Le cas « Assiette durable ».
 - 4.2. Le cas « DAV / B2K ».
5. Conclusion

Le rôle de l'animation dans la construction de projets innovants, le cas des structures hospitalières.

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1.0 Introduction

Le développement de la réflexion sur l'innovation dans les services a permis de mettre en évidence la complexité d'un processus qui suppose une multiplicité d'opérations matérielles, informationnelles, méthodologiques et relationnelles, s'appuyant sur des compétences très diverses tant chez l'innovateur que ses partenaires (Djellal & *al.*, 2004). Parallèlement, le rôle de l'activité d'attention à l'environnement sur le déclenchement et le développement d'une innovation a été mis en évidence par (Gozim, 2015). Alors que cette fonction d'animation est totalement occultée par la majorité des auteurs, Lesca (2003) n'hésite pas à la considérer comme un facteur critique au succès et à mise en place et à la pérennité d'un dispositif de veille stratégique, sans pour autant développer son rôle sur le processus d'innovation.

L'absence de rapprochement dans la littérature des services entre veille et innovation et plus spécifiquement entre les deux processus et leurs différentes étapes a conduit Gozim (2015) à investiguer les liens entre la pratique de la veille et la dynamique de l'innovation dans ce secteur d'activités. Quoiqu'étudié par quelques auteurs (Jain, 1984 ; Engledow & Lenz, 1985 ; Fuld, 1991 ; Lesca & Chokron, 2002), le rôle de l'animation sur la richesse de la veille nous a semblé sous estimé et par là même son impact sur le processus d'innovation de services. Le rôle du chef de projet, considéré, dans la majorité des cas, comme l'animateur (Quang & Gonin, 1992), le meneur d'hommes (Rojot & Bergmann, 1989) dans la conduite du processus d'innovation semble être compris de façon différente selon les structures. Gozim (2015) ayant pu faire état d'une intégration de la veille tant en phase amont qu'en phase opérationnelle du processus d'innovation, il nous a paru intéressant de se pencher sur les modalités d'introduction de la fonction d'animation. Nous souhaitons montrer dans cette communication comment elle intervient en amont du projet et lors de sa phase opérationnelle. Nous nous efforcerons de faire apparaître qu'elle relève du contexte managérial et non pas seulement des caractéristiques personnelles de l'animateur. Elle favorise ainsi tant la conduite du processus d'innovation, que l'émergence d'innovations complémentaires.

Après une présentation de l'état de l'art sur nos deux angles d'analyse, nous en confronterons les conclusions à 2 études de cas réalisées dans les secteurs privé et public hospitalier, sur des innovations non médicales.

2. Innovation de service, chemin faisant

Un certain nombre d'auteurs spécialisés dans le champ du management des services (Jougoux, 1993 ; Everaere, 1997 ; Durieux, 2000 ; Flipo, 2001 et Abramovici & Bancel-Charensol, 2002, etc.), et plus particulièrement celui du marketing des services (Shostack, 1984 ; Eiglier & Langeard, 1987 ; Scheuing & Johnson, 1989 ; Jallat, 1992 & 1994 et Lovelock & Lapert, 1999, etc.) ont consacré

des investigations aux aspects spécifiques de l'innovation. La plupart ont insisté sur le fait que les processus connus pour les biens matériels nouveaux devaient être revus pour tenir compte des caractéristiques des services et de l'organisation des entreprises du tertiaire.

2.1 Le déroulement de l'innovation dans les activités de service

L'ancrage de cette révision peut être situé dans la « *co-production* » du service entre prestataire et client, spécificité majeure de la relation entre ces deux (2) parties prenantes (Eiglier et Langeard, 1987 ; Gadrey, 1994). « *Les acteurs de l'offre et de la demande coopèrent à des degrés divers pour l'obtention de services et d'effets utiles. Il s'agit de processus de coopération portant sur la conception, sur la réalisation, sur le contrôle et sur l'évaluation d'une réalité "non déjà là", faisant l'objet d'une demande (souvent imprécise) à laquelle répondent des offreurs* » (De Bandt & Gadrey 1994, p. 20). De cette implication réciproque et unique peut naître l'innovation. Chaque nouveau service étant « *co-produit* » par le prestataire et le client selon des rôles et enjeux variables, par rapport à la nature du service et au contexte politique de la gestion de celui-ci. Il n'est donc pas étonnant de définir comme facteur essentiel de l'instauration d'une dynamique d'innovation cette relation, qui ne saurait être réduite au quotidien de l'exploitation courante (Flipo, 2001).

Les travaux de Djellal & Gallouj F. (1999) permettent de classer de multiples cas de figures d'innovation en fonction des circonstances du déclenchement du processus. Cependant, afin de demeurer pragmatique, uniquement trois cas seront distingués : celui où le client est clairement à l'origine de l'innovation (market pull), puis celui où il s'agit des prestataires (*technology push*), et enfin un troisième cas, où l'innovation s'avère être le fruit direct de l'interaction, à la suite d'initiatives et de circonstances qui peuvent être dues au hasard.

- Dans le premier cas de figure, l'aspect de « *co-production* » est particulièrement évident, car le client demande généralement à un prestataire de lui résoudre son problème, en raison de son incapacité à le faire lui-même, d'une absence de volonté, ou étant occupé par d'autres préoccupations jugées plus importantes (Sundbo & Gallouj F., 1998). Aussi, la solution ne saurait être trouvée par le prestataire unilatéralement, cela signifie que le client est nécessairement impliqué dans la recherche de solution (Goffman¹, 1968).

- Dans le second cas, le terme « *technology* » fait référence au savoir-faire du prestataire qui est à l'origine de l'innovation, et non pas seulement aux équipements technologiques auxquels il a recourt. Si la proposition peut émaner directement du prestataire de services extérieurs, les salariés peuvent aussi chercher, à travers de nouvelles technologies ou une veille spécifique, des opportunités de développement pour l'entreprise dans laquelle ils travaillent.

¹ Dans son étude des interactions entre les patients et le personnel soignant d'un hôpital psychiatrique, Goffman (1968) a eu pour objectif d'identifier un système d'interactions spécifiques, de comprendre le comportement de chacun en l'expliquant par rapport à celui des autres.

- Enfin, une idée remarquable peut naître puis murir à la suite d'une rencontre fortuite à l'occasion d'interactions inédites entre les intelligences (prestataires / clients / autres parties prenantes). L'exploitation de circonstances, d'opportunité de mouvements spontanés peut ainsi faire l'objet d'une rationalisation d'ensemble : l'action des clients et simultanément la prise de conscience chez le prestataire, puis, l'intervention de multiples parties prenantes nécessaires à la cristallisation du projet, enfin, la mise en œuvre d'un réel processus d'innovation géré par les parties prenantes, nourri d'une grande énergie de part et d'autre.

2.2 Spécificités des services hospitaliers

En l'absence d'une concurrence aussi pressante que dans la majorité des autres secteurs d'activité, le processus d'innovation dans les services non médicaux du secteur hospitalier trouve essentiellement sa dynamique créative dans celle des salariés, en fonction de la liberté d'expression accordée (Gozim, 2015). L'analyse du processus de la prestation de services hospitaliers et des innovations correspondantes réalisée par l'équipe de l'université de Lille (France) permet d'enrichir notre réflexion, dans ce contexte particulier et d'affiner l'analyse des relations entre les acteurs de l'innovation dans ce secteur.

S'appuyant sur la représentation lancastérienne élargie du produit ou du service F.Gallouj (2002) et Gallouj *et al*, (2004) rendent ainsi compte des nombreuses caractéristiques du service obtenues, par la mobilisation de compétences, de matériel, de méthodologies, de relations. Par ailleurs, ils rappellent l'impact de la prégnance des tutelles sur les organisations prestataires et ses effets sur la dynamique d'innovation née des interactions entre agents prestataires et client usager.

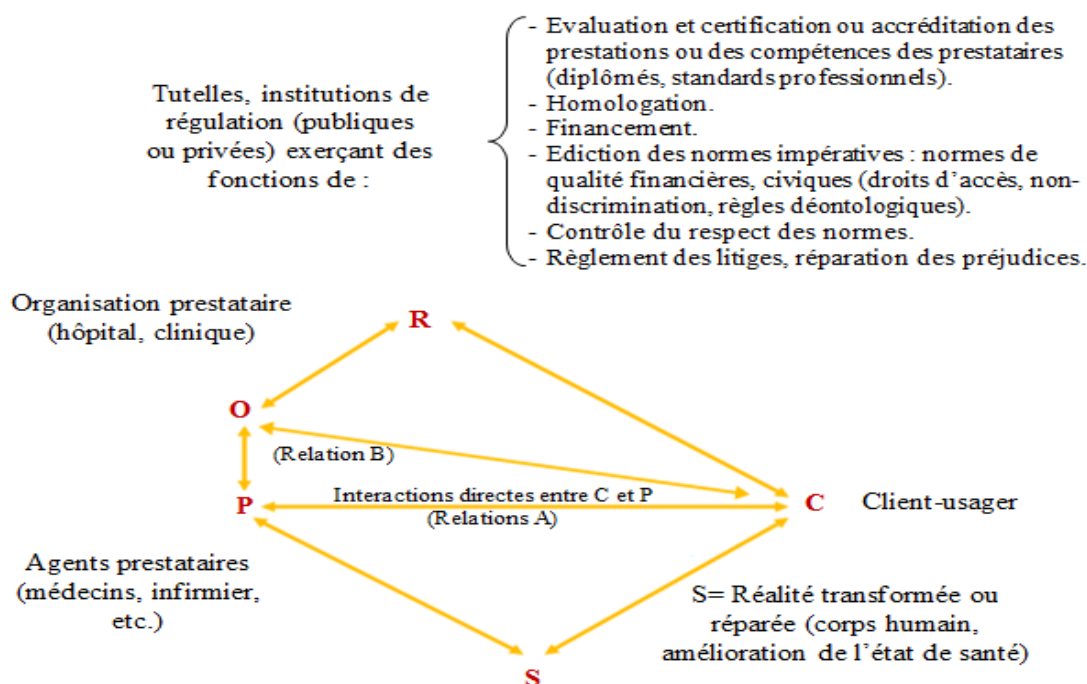


Fig. 1: Pentagone des services hospitaliers

Source : Djellal F., Gallouj C. & Gallouj F, (2002),

Mais parallèlement, comme dans de nombreuses organisations productives aujourd'hui, les interactions internes entre services prennent régulièrement la forme de relations de clientèle (Sasser & Arbeit, 1976 ; Grönroos, 1978, Berry, 1981). Ainsi le service informatique devient-il le prestataire du service restauration de la clinique lorsque ce dernier veut transformer l'offre de repas (mode de fabrication, variété des plats, ..) proposée tant aux patients qu'aux salariés de la clinique (Gozim et Monnoyer, 2014). De même, tous les départements dédiés aux soins sont-ils clients de la filière blanchisserie de l'hôpital (Gozim, 2015).

Capron, (2006) évoque dans le processus de développement de l'offre de services, un mixage de « market pull » et de « technology push » Il nous semble tout à fait envisageable d'y intégrer dans les services non médicaux en milieu hospitalier, le troisième cas envisagé par Djellal & Gallouj F. (1999), à savoir l'exploitation d'une idée ou d'une rencontre fortuite, selon les circonstances des relations prestataires / clients, ou prestataires / marchés, au sens plus large.

Néanmoins, ce constat n'est pas suffisant pour prétendre que l'innovation sera féconde. Le rôle d'une surveillance de l'environnement de l'entreprise sur la qualité de la prise de décision mise en évidence par Lesca (1986) est souligné sur la dynamique de l'innovation par des chercheurs comme Simon (1960) et Aguilar (1967). Cette dynamique s'enrichit dans un environnement managérial porteur, qui, dans le cadre de la gestion de projets innovants, organise et favorise les interactions entre les individus, la circulation de l'information, l'adaptation rapide à des événements inattendus (Jougleux, 1993), sur une base de co-développement avec les clients, et non pas seulement de satisfaction immédiate.

3. De la veille à l'animation de projets

Qu'elle soit passive ou active, la veille permet de porter une attention à l'environnement et de décoder les signaux dont il est porteur (Martinet & Ribault, 1989). Elle soutient alors l'activité, le métier et les processus clés de l'organisation, la prise de décision des managers et la réalisation d'une stratégie délibérée ou émergente. Les travaux de Lesca et son équipe (2006) ont fait apparaître les effets positifs de la veille anticipative sur l'identification des phénomènes potentiellement intéressants pour le développement de nouveaux produits ou services. La veille consiste alors à identifier des discontinuités ou des ruptures (exploration de l'environnement) qui pourraient alimenter très en amont des démarches d'anticipation, d'innovation et de créativité. De même, les travaux de Simon (1960) mettent en exergue, les effets de la veille sur le processus de décision stratégique via la phase d'intelligence de l'environnement. Notre investigation sur le terrain permet de constater que l'exploration et l'intelligence de l'environnement peuvent se situer en amont ou en parallèle du processus d'innovation non médicale. La veille s'intègre donc dans la construction du projet innovant (Gozim, 2015). Ce rapprochement nous conduit à analyser la fonction d'animation tant dans le processus de veille que dans celui de la conduite de projets dans les services non médicaux du secteur hospitalier caractérisé comme nous l'avons dit précédemment par la multiplicité des inter relations internes et externes. En effet, certains éléments de littérature insistent sur le rôle de l'animateur dans ces deux processus.

3.1 Animation et veille

Dans le contexte de l'animation d'un processus de veille, Romani & Bournois (2000) rapprochent l'animation de l'organisation de la communication, interne et externe, de l'intelligence stratégique. Le réseau externe lie l'entreprise à l'extérieur par un flux d'informations, à caractère stratégique, dont le contenu est technologique, concurrentiel et commercial. Le veilleur se doit donc d'être un animateur, avec ce que le terme porte en lui de capacité d'écoute. Quant aux réseaux internes, Romani & Bournois (2000) considèrent qu'ils doivent être animés pour rester vifs, vivaces et vigilants. Réunions régulières² (47,5 %) et rencontres individuelles (38,4%) sont les modalités les plus courantes pour entretenir les réseaux. La diffusion régulière de supports est présente mais beaucoup moins utilisée (9,9%). Rappelant le rôle du responsable de l'intelligence stratégique dans l'animation des réunions, Romani & Bournois (2000) insistent sur les modalités qui permettent d'entretenir les réseaux de personnes. Il s'agit bien d'une « façon de faire » pour motiver les personnes ou les participants au réseau d'intelligence stratégique. Ils concluent que : « le système d'animation consiste essentiellement en la mise en œuvre par les participants, de l'action collective finalisée ».

Doucet & Gingali (2004), prenant en compte la dimension sociologique de la veille stratégique, vont dans le même sens, pour montrer comment cette activité peut acquérir une légitimité. Lors de la mise en place du dispositif de veille, les auteurs évoquent l'animation d'un « groupe de travail » composé de personnes de compétences diverses. Celui-ci permet de positionner les membres du groupe dans une dynamique et par conséquent, de favoriser leur niveau d'implication.

S'agissant de la position de l'animateur au sein de l'organisation, les auteurs tels que Engledow & Lenz (1985), désignent l'animateur par le vocable de « champion », précisant que celui-ci devrait être haut placé dans la hiérarchie de l'entreprise et ainsi disposer d'une forte influence sur les participants du dispositif, mais aussi sur la direction générale. Mais, le champion doit être épaulé par les participants du groupe de travail de la veille qu'ils appellent « sponsors » (Simon & Kern, 2001). Ces auteurs identifient aussi plusieurs autres rôles clés, à savoir : « the CI leadership, the CI practitioner, the CI champion, the CI sponsor ». La qualité de leurs interrelations affecte leur influence sur les utilisateurs potentiels des informations de veille, mais aussi sur les veilleurs sollicités pour rechercher ces informations et la prise en compte de l'utilité de celles-ci.

3.2 Animation et innovation

L'innovation est avant tout un processus collectif (Van de Ven, 1986 ; Djellal & Gallouj F., 1999 et Le Masson, Weil & Hatchuel, 2006). Elle ne peut être « vendue » en interne que si les initiateurs et leurs politiques sont crédibles ; en effet, satisfaire au jour le jour des clients de plus en plus exigeants, rend le personnel en contact lui-même de plus en plus exigeant vis-à-vis de ses managers (Flipo, 1984). Dès lors, la valorisation de l'esprit d'équipe, de l'œuvre collective, du bien de l'entreprise tout entière pour chaque projet d'innovation est une pratique incontournable. « *L'agir*

² Les objectifs de ces modalités (les réunions) peuvent être envisagés à des fins plus larges telles que la création collective de sens, la détermination des besoins des « clients » du dispositif, la connaissance de « *qui détient quoi ?* », la suscitation continue de l'intérêt des membres de l'entreprise à l'égard de la veille, etc.

ensemble » est devenu une exigence : il ne s'agit pas seulement de tenir un discours, mais d'instaurer un véritable système de management qui favorise le comportement synergique des groupes de projet (Borzeix, 1998).

Le cycle de développement d'une innovation s'étend généralement sur plusieurs mois, voire même sur des années (Maidique & Zirger, 1985). De ce fait, l'énergie déployée par les acteurs de l'innovation doit être à la fois parcimonieusement répartie selon les étapes afin de durer, mais aussi judicieusement employée, de telle sorte que ces étapes soient franchies de manière décisive, empêchant ainsi le processus de s'enliser. Par ailleurs, le processus d'adoption de l'innovation ne s'entame pas au moment de la commercialisation du service nouveau, mais bien avant, puisque celui-ci doit d'abord trouver sa légitimité à l'interne (Flipo, 2001). Le management de ce processus doit donc se situer dans une continuité durant tout son déroulement, du début « *interne* » à la fin « *externe* ». La rupture de cette continuité peut s'avérer une cause majeure d'échec, ou du moins de difficultés, à laquelle peut s'ajouter l'ignorance réciproque des acteurs des processus interne et externe.

Qu'il s'agisse de la phase de veille ou de celle du développement de l'innovation, la littérature, et en particulier Martinet & Ribault (1989) jugent que : « l'animation garantit la cohérence de l'ensemble de tout le travail ». Tabatoni & Jarniou (1975) précisent que l'animation permet de gérer un processus d'intégration d'efficacité individuelle, pour améliorer l'efficacité organisationnelle. Ils estiment que l'animation a pour but : « *d'harmoniser les significations des tâches et des relations au sein de l'organisation qui sont susceptibles d'interprétations diverses de la part des personnes et des groupes* » (Tabatoni & Jarniou, 1975, p. 138). Pour sa part, Hermel (1989) a porté l'éclairage sur une autre dimension de l'animation : « donner de la vie et insuffler régulièrement de l'énergie à l'unité, (...) combattre la routine et l'entropie, (...) permettre l'innovation et l'anticipation ».

Cette double analyse de la littérature laisse apparaître un consensus quant à l'intérêt d'une animation tant dans les phases de veille que dans les phases de conduite de projets. Le titre de champion donné à l'animateur, chef du processus veille ou du projet, son intégration dans les équipes dirigeantes montre que cette fonction requiert des qualités personnelles originales, mais aussi un savoir faire reconnu et accepté par la structure, au delà des curriculum vitae traditionnels.

La confrontation de ces résultats à deux cas observés sur le terrain, permet de réifier les effets de l'animation et d'effectuer des propositions managériales.

4. Deux cas d'animation de processus d'innovation

Comme nous le rappelions en introduction, la conduite du processus d'innovation semble être comprise de façon différente selon les structures. En ayant choisi d'introduire formellement la veille dans le processus d'innovation, c'est toute la démarche d'animation, de l'idée à sa concrétisation, que nous avons observée dans deux structures de soins, l'une privée l'autre publique. Les deux études de cas présentées rapidement ici sont issues d'un travail doctoral dans lequel plus de détails peuvent être trouvés (Gozim, 2015).

Nous avons fait le choix de présenter les cas sous forme narrative en faisant apparaître *en italique* dans le texte, les éléments relatifs à la pratique de l'animation de la veille ou de la construction du projet.

4.1 Le cas « Assiette Durable »

La clinique P, établissement de soins privé à but lucratif, a été confrontée à une triple évolution qui a affecté son activité : baisse de l'activité des médecins, concurrence accrue d'autres établissements de santé, baisse du niveau de prise en charge des soins par la sécurité sociale française. Ces évolutions ayant eu une forte incidence sur le chiffre d'affaires, la clinique P a décidé de mettre en place une nouvelle stratégie. Cette dernière a consisté, bien sûr, à être vigilant en matière de coûts, mais surtout à attirer plus de patients.

La nouvelle direction de la clinique a décidé d'aller à la rencontre de ses différents services, pour demander ce qui pourrait, à leurs yeux, améliorer les prestations offertes à la clientèle. Toutes les suggestions convergeaient étonnamment vers la refonte des menus. *Ce projet était en quelque sorte ancré dans les esprits. Lors des entretiens menés dans le cadre de cette recherche, les employés du service restauration ont stipulé que cette idée leur trottait déjà dans la tête depuis environ dix (10) ans, mais ils n'avaient jamais franchi le pas, puisque l'ancienne direction ne souhaitait pas s'aventurer sur cet axe-là.*

Parallèlement, une diabétologue, membre du conseil d'administration de la clinique P, découvre un ouvrage qui avait pour titre : « Tous gros demain ? : 40 ans de mensonges, 10 kilos de surpoids » du chercheur et agronome Pierre Weill³. La lecture de ce livre a eu un tel impact sur la conception de l'alimentation auprès de cette diabétologue, que celle-ci a tenu absolument à faire partager la vision de l'auteur à ses plus proches collaborateurs⁴. L'auteur a été invité pour animer une conférence. Celle-ci était basée sur son nouvel ouvrage intitulé : « Mon assiette, ma santé, ma planète », qui à l'époque n'était pas encore commercialisé. Les idées de l'auteur furent qualifiées de « révolutionnaires ». Il s'en est suivi une réflexion approfondie et prise de conscience de chacun des membres de l'établissement, ayant pour conséquence l'entame du projet « Assiette Durable ». Le contenu de l'innovation consistait en la refonte des menus patients en fonction désormais de nouveaux critères tels que la démarche de développement durable, l'évolution de la société, une meilleure connaissance de certaines pathologies, des régimes spéciaux, des allergies, des problèmes de surpoids, etc.

La veille personnelle menée par la diabétologue se traduit par une animation de la réflexion tant au sein du conseil d'administration que dans l'équipe diététique et soins. L'idée que dans l'établissement, les clients seraient soignés mais qu'ils bénéficieraient aussi d'une nourriture saine et mise en œuvre dans le cadre d'une « éthique » est apparue comme une évolution de la stratégie lisible, tant en interne qu'en externe. Selon l'un des chefs cuisiniers « la restauration n'était pas valorisée à sa juste valeur, contrairement à aujourd'hui ». La nouvelle direction estime avoir trouvé un moyen d'apporter une valeur ajoutée aux patients, tout en améliorant l'organisation du service restauration, via une nouvelle motivation des employés.

³ Weill P. travaille depuis quinze ans sur le lien entre modes de production agricole et santé. Il a signé de nombreux articles scientifiques sur le sujet.

⁴ Par la suite, la diabétologue a voulu connaître leurs impressions vis-à-vis de l'ouvrage. Autrement dit, celle-ci a voulu constater la bonne réception des informations et des idées qu'elles véhiculent auprès des personnes concernées.

Dès lors, une « commission menu » pluridisciplinaire s'est constituée et réunie, à plusieurs reprises, dans le but de recueillir des informations sur les besoins de l'ensemble des catégories professionnelles œuvrant au sein de la clinique P. Cette commission fut constituée de médecins de différentes spécialités, de chefs cuisiniers et d'une spécialiste de la construction des menus, de diététiciennes, de soignants (aide-soignante et cadres de soins), d'une hôtelière, d'une gouvernante, d'un membre du service qualité et d'un informaticien. *Dans le cadre du processus d'innovation, le travail de la commission alimente une interaction entre de multiples acteurs, issus de champs ou secteurs différents et des positionnements hiérarchiques différents.* Ce groupe de travail pluridisciplinaire réfléchit à la meilleure prestation à apporter au patient, formule des suggestions en se basant sur leurs connaissances et compétences et élabore un cahier des charges, définissant les règles pour reconstituer une nouvelle carte. Toutefois, l'aspect développement durable n'a pas été abordé lors de cette commission.

Outre la cellule pluridisciplinaire, c'est-à-dire la « commission menu », la construction du projet « Assiette Durable » s'est également appuyée sur *des cellules mono-disciplinaires, qui ont été mobilisées* au cas par cas, pour chaque axe d'amélioration du projet : communication vers les patients, les salariés commensaux et vers l'extérieur, développement durable, optimisation des dépenses sans impact sur la qualité, développement de partenariats pérennes avec les fournisseurs, etc.) gravitant autour de l'axe principal, à savoir la refonte des menus. Il est à préciser que pour chacun de ces axes, *un « pilote » a été désigné*⁵. Carte blanche lui a été accordée afin de recruter les personnes ayant les compétences requises pour œuvrer sous son autorité à la bonne exécution de la tâche qui lui était confiée. Il était tout à fait envisageable pour un individu appartenant à la cellule d'avoir un besoin d'informations et de collaborer avec des personnes évoluant au sein d'autres services ou cellules, sans pour autant en demander l'aval à son supérieur, à savoir le pilote. Par ailleurs, Il n'était pas à exclure que celui-ci, aille requérir de l'aide auprès d'autres individus ou pilotes.

La collaboration des chefs cuisiniers avec les diététiciennes s'est révélée cruciale pour le projet. Il fallait en effet élaborer les menus, les agrémenter, les écrire, sachant que cette fois l'aspect développement durable était constamment présent dans les esprits. Les cloisonnements latéraux habituels entre la restauration et la diététique, liés aux différences de sensibilité (processus de fabrication versus équilibre alimentaire) ont été rompus. *L'affirmation des nouveaux impératifs stratégiques de l'administration de la clinique a permis, en effet, de résoudre le manque habituel de communication entre les deux (2) services, en favorisant un esprit de connivence, de complicité et d'interaction nécessaire au développement d'un travail collectif .*

La construction du projet n'a pas impliqué les seuls cuisiniers et diététiciennes puisqu'il a fallu élaborer une application informatique pour constituer les recettes, un logiciel pour mettre en place les menus. Le service informatique a été très sollicité par les diététiciennes et les chefs cuisiniers, pour faciliter leur travail et permettre un gain de temps et accélérer la communication entre l'hôtelière en contact avec les patients et les cuisines. Si un plat n'était pas apprécié, si un menu était trop lourd,

⁵ Autrement dit, un responsable de l'animation.

l'hôtesse acheminait l'information vers ses supérieurs - c'est-à-dire, les diététiciennes et le chef de projet - qui prenaient par voie de conséquence les mesures nécessaires. *A ce stade, les hôtesse ont eu la liberté de transmettre directement et en temps réel les renseignements qu'elles jugeaient pertinents aux utilisateurs potentiels désignés.* Le service restauration pouvait, dès lors, avoir un retour, une critique constructive, lui permettant de se réajuster et de s'améliorer. C'est ainsi qu'un certain nombre d'aller-retour fut effectué, renforçant en cela l'idée d'un processus d'innovation non linéaire.

Enfin, le service communication a eu pour mission de faire connaître en interne le projet et les nouveaux menus.

Les employés⁶ ont été informés des étapes de développement du projet via un article publié dans le journal interne de l'établissement⁷, par courriels, ou via des écrans télé⁸, etc.

Concernant les patients, un support explicatif, décrivant la nutrition durable au sein de la clinique, a été fourni aux patients. Une chaîne de télévision destinée à l'aspect : « restauration durable » a été créée. Enfin, l'hôtesse chargée d'amener le plateau repas au chevet du patient devait expliquer les choix effectués dans la confection du menu. Toutefois, il s'est avéré que celle-ci avait du mal à mettre en exergue tout ce qui se faisait en rapport avec le projet, ce qui réduisait les effets attractifs recherchés. La direction aurait donc pu porter une réflexion sur une politique de « marketing interne⁹ » destinée aux hôtesse, dans le but de mieux leur expliquer l'intérêt de l'innovation (Flipo, 2001), sachant qu'elles représentaient un véritable cordon ombilical reliant l'établissement à ses patients (Jallat, 1992).

D'autre part, plusieurs soirées furent organisées avec le corps médical, en rapport avec la refonte de menus et les axes d'amélioration adoptés. Il était question d'inciter les soignants à être attentifs au thème de l'alimentation, de les motiver pour collecter et transmettre les informations pertinentes¹⁰. Il était tout autant nécessaire que les professionnels de santé puissent évoquer le projet, si l'occasion venait à se présenter.

Pour ce qui est de la communication destinée à l'externe, une rubrique a été créée sur le site internet de la clinique, des articles ont été proposés dans des revues spécialisées et généralistes. Néanmoins, cela demeure insuffisant au regard du chef de projet.

⁶ L'ensemble des employés tout autant que les patients ont été impactés par ces nouveaux menus, puisque tout ce qui est servi aux patients l'est au restaurant de l'établissement.

⁷ Consultable par le biais de l'intranet.

⁸ La cafétéria dispose d'un écran télé géant diffusant les informations et les reportages en boucle. Toutefois, le son est coupé pour ne pas déranger le personnel en train de déjeuner.

⁹ La meilleure méthode pour réussir le marketing externe dans une entreprise de services consiste à considérer le personnel en contact comme les premiers clients de l'entreprise d'où cette expression « marketing interne » (FLIPO, 2001).

¹⁰ La diabétologue que nous avons interrogée estime être à l'écoute du patient concernant les aspects se situant hors du contexte médical, précisant en cela l'importance que celui-ci accorde aux services annexes. Elle stipule qu'il faut toujours avoir des retours qu'ils soient positifs ou négatifs, et faire remonter les informations, évidemment après les avoir préalablement filtrés. Autrement dit, il ne faut pas tenir compte des remarques injustifiées, mais sélectionner les informations qui vont réellement renseigner sur la situation actuelle et aider à apporter le changement.

D'après le directeur technique, informatique et logistique : *« il était très important qu'une personne puisse chapeauter et coordonner les opérations. Quelqu'un qui puisse cadencer le processus d'innovation, poser la question : où on en est ?... S'assurer qu'il n'y a eu l'économie d'aucune phase, observer un certain cap, déterminer un planning sans pour autant l'imposer »*. Celui-ci précise, en outre, que le projet « Assiette Durable » fut parfois confronté à des écueils à tel ou tel stade de son développement, ce qui impliquait un besoin d'informations spécifiques pour pouvoir franchir ces obstacles. *En l'occurrence, des réunions furent organisées lorsqu'un problème était identifié, qu'il fallait comprendre et résoudre. Dans cette situation, le chef de projet éprouvait un vif intérêt à motiver le personnel pour rechercher des informations afin de parvenir à formuler des solutions.*

Pour conclure le directeur technique, informatique et logistique affirme que : *« l'intérêt de travailler à la clinique P, c'est d'être écouté, c'est le dogme de la direction, à savoir qu'il est à la portée de tout le monde de proposer un projet, sachant que la direction est ouverte à quelque suggestion que ce soit, si toutefois celle-ci est bénéfique aux patients, aux équipes et qu'il n'y a pas de problèmes économiques derrière »*. La direction de la clinique encourage donc les équipes et les services à proposer des projets, plutôt que de leur en imposer.

La présentation de ce cas nous semble mettre en valeur l'efficacité des pratiques de l'animation de la veille et de la gestion de projets sur le déroulement du processus d'innovation, mais aussi la perception des manques à certaines étapes et leur mémorisation par les personnes interrogées. Il nous semble aussi qu'il met en exergue les effets positifs de l'animation sur l'« empowerment » des acteurs impactés par la construction du projet et sa réalisation. En effet, la dynamique inter-fonctions suscitée par l'animation du champion de la veille, comme celle du champion du projet permet aux équipes de se découvrir réciproquement, de connaître la réalité du travail des autres et d'en mieux comprendre les difficultés et la valeur. Le caractère personnel de ces découvertes permet une appropriation des informations par les salariés qui semble beaucoup plus forte que celle qui est le fruit de la lecture de documents, de tableaux d'affichage et même d'écrans vidéo, même si cette dernière reste nécessaire du fait de sa durabilité dans le temps.

4.2. Le cas « DAV¹¹ / B2K¹² »

Le projet « DAV / B2K » est né des conclusions du groupe de travail relatif au contrat linge¹³ entre la blanchisserie et la direction des soins du centre HP. Ce groupe qui

¹¹ Distributeur Automatique de Vêtements.

¹² Le modèle a été baptisé B2K.

¹³ La forte augmentation du volume de linge à traiter (+ 36 % en 20 ans) a rendu indispensable une standardisation des flux de linge. La logique client / fournisseur instaurée à travers le contrat linge au sein de l'établissement a permis :

- Un lien direct entre la blanchisserie et les services : le chargé de clientèle et son équipe de référents linge sont à l'écoute des besoins des soignants sur les sites.
- Un plus haut degré de rationalisation et d'hygiène : le linge mis sous housse et transporté sur des étagères mobiles est livré directement dans les services.
- Une meilleure gestion des stocks : chaque service de soins se voit attribuer une dotation en linge adaptée à ses besoins.

Ce contrat linge concerne les services de soins du centre HP mais aussi des clients extérieurs comme l'ICR (traitement du cancer) et quelques associations humanitaires (Restaurants du Cœur,...).

faisait collaborer des cadres, des aides soignants, des infirmières et des médecins, a décidé de mettre en place une démarche d'amélioration continue de la qualité, pour répondre aux critiques dont le traitement du linge faisait l'objet, et tout particulièrement celui du nettoyage des tenues professionnelles. *Le responsable de la filière blanchisserie, qui avait travaillé précédemment chez le leader européen des blanchisseurs privés*, a proposé à la direction des soins de mettre en place un système automatisé de distribution des tenues pour en améliorer l'accès aux soignants

Le personnel soignant a besoin de disposer de tenues décontaminées 7j / 7 et 24h / 24, quel que soit son lieu de travail au sein de l'hôpital. L'analyse des besoins en linge des services de soins¹⁴ a été effectuée par deux responsables (magasin et adjoint fonction linge) à l'issue de réunions de *travail avec les cadres de santé, qui, faut-il préciser, exercent une influence sur le personnel soignant*.

Le but du DAV est de centraliser la distribution des tenues en un seul point pour réduire la manutention et les flux, éviter les pertes et les vols, avoir un outil de suivi pour déterminer ce qui a été fourni et connaître les rotations. Désormais, il n'est plus nécessaire de délivrer les tenues directement auprès des services concernés. Pour disposer de sa tenue, le soignant se sert directement au niveau du distributeur, qui a d'ailleurs été positionné à un endroit stratégique, c'est-à-dire à proximité des vestiaires.

Le distributeur automatique présentait un défaut au niveau du récupérateur de cintres portant les vêtements. En l'occurrence, la barre de déchargement s'est révélée inadaptée au nombre de cintres entassés. Le référent linge / DAV nous a confié avoir soumis une solution à ce problème, mais celle-ci avait été rejetée : « à l'hôpital ce n'est jamais possible à cause de l'argent et c'est dommage ». Le référent avait imaginé une installation pour éviter que les cintres ne tombent sur le distributeur et ne provoquent un blocage. Le responsable de la filière et chef du projet « *DAV / B2K* », qui a rejeté l'idée du dispositif, nous a expliqué que sa décision avait été prise en prenant en considération l'investissement nécessaire, mais surtout que cela n'avait pas été prévu dans le budget initial. Il a nous a précisé que : « *si la proposition avait été formulée par quelqu'un occupant un poste hiérarchique plus élevé, cela n'aurait eu aucune influence sur ma décision, parce que les idées sont préétablies* ».

Une fois l'installation achevée, un test¹⁵ a été effectué avec un premier service, s'en est suivi un second, trois mois plus tard. D'après le chef de projet : « *la blanchisserie s'est occupée à tour de rôle des services de soins qu'elle avait ciblés, avec un travail de communication dès plus remarquable* ». C'est la responsable antenne linge¹⁶ qui

¹⁴ La responsable magasin a été en contact avec les services de soins pour déterminer le nombre d'agents qui allait être concernés par le nouveau système et combien de tenues seraient requises. C'est ainsi que l'on peut considérer la relation avec les services de soins comme une source d'information de nature pratique et relationnelle, ayant permis de disposer de renseignements nécessaires pour aider à la progression du projet.

¹⁵ Le chef de projet nous a confié qu'un DAV avait déjà été mis sur pied dans la région, chez un établissement hospitalier privé, qui n'est autre que l'ICR : « ... ils se sont un peu cassés les dents, mais ça nous aura au moins permis d'éviter de faire les mêmes erreurs ».

¹⁶ La responsable antenne linge RAN fait partie intégrante de la sous-filière clientèle. De ce fait, elle est chargée de chiffrer le nombre de tenues nécessaires, afin de satisfaire les besoins de l'ensemble des services concernés par le B2K. Celle-ci est en contact permanent avec les soignants, ce qui lui permet de disposer des informations

a fait la promotion du nouveau système automatisé. Celle-ci s'est efforcée de convaincre les soignants de l'utilité du système : envoi de lettre d'informations DAV, mise au point et collage d'affiches, création et distribution de flyers, « quick forum » maison du personnel¹⁷, mailing spécifique pour les médecins, mise en place panneaux indication DAV, visites de l'engin par les cadres utilisateurs, réunions d'information, recours à un film explicatif, etc. Bien que les avantages de l'innovation soient perceptibles par les soignants, puisqu'ils peuvent disposer de linge à toute heure, la tâche de conviction s'est révélée difficile : « il a fallu au préalable que le personnel soignant concerné s'approprie la machine, alors que jusqu'à présent il était en quelque sorte materné, puisqu'on lui ramenait son linge directement à son service ». Enfin, l'innovation a permis une économie de la main d'œuvre.

Le directeur communication culture, relations usagers, médiation et association du centre HP explique qu'il lui paraît nécessaire de porter l'attention sur ce qui était technologiquement désavantageux, en soulignant toutefois la possibilité d'agir en conséquence. Par exemple, si l'outil venait à tomber en panne, un dispositif devrait être mis en place, s'appuyant sur des individus effectuant des astreintes.

Le chef de projet « DAV / B2K » nous a précisé qu'une formation avait été spécifiquement prodiguée aux référents linge pour les inciter à adopter un comportement plus courtois et aimable, à faire preuve de davantage de tact et de diplomatie, en particulier en cas de désaccord.

Le responsable client, adjoint fonction linge et la responsable antenne linge contredisent le responsable de la filière blanchisserie, en déclarant qu'aucune formation en rapport avec les services de soins n'avait été destinée aux référents. D'ailleurs, le référent linge / DAV confirme qu'aucune formation ne lui a été proposée. Seule celle destinée à l'hygiène lui a été imposée, comme pour tous les autres membres du personnel de la blanchisserie. *Pour sa part, la responsable magasin déclare avoir suivi une formation pour gérer les conflits entre collègues, mais sans rapport avec les services de soins.*

Par ailleurs, contrairement aux affirmations de son supérieur hiérarchique¹⁸, le responsable client, adjoint fonction linge ne peut considérer les réunions de sensibilisation comme des moyens de facilitation du développement des projets innovants. Selon ses propos : « *des réunions ont lieu, mais seuls les dysfonctionnements et les erreurs y sont exposés* ». Pour la responsable antenne linge, il fut un temps où les réunions de sensibilisation existaient, mais ce n'est plus le cas¹⁹. Elle précise que : « celles-ci ne sont plus organisées sous prétexte que le personnel et les dirigeants de la blanchisserie sont constamment débordés ».

qui lui sont requises. Elle nous a confié que nombreux sont les conflits avec le magasin de la blanchisserie qui, la plupart des temps, ne tient pas compte de ses calculs, essayant toujours de négocier, étayé par leurs propres chiffres.

¹⁷ « En fait, une permanence de deux (2) heures a été organisée à l'heure du repas où les agents ont pu être informés qu'il y a une nouvelle machine qui arrive et un nouveau système, c'est de la communication ni plus ni moins », selon le chef de projet.

¹⁸ En l'occurrence, le responsable de la filière blanchisserie.

¹⁹ Elle peut l'affirmer au vu de son ancienneté, car c'est depuis presque trente (30) ans qu'elle travail pour la filière blanchisserie.

Malgré les divergences d'opinions, il y a tout de même une bonne entente au sein de la filière. *D'après le responsable de la blanchisserie, c'est la communication facilitant la coordination qui en est à l'origine. Quant à la responsable magasin, celle-ci affirme sa satisfaction au travail en mettant en avant l'ambiance qui y règne, valorisant l'esprit d'équipe et l'œuvre collective.*

Le chef de projet du « DAV / B2K » estime que, malgré les difficultés rencontrées, la filière blanchisserie dispose bel et bien d'une culture organisationnelle d'innovation. Il s'en attribue le mérite et considère que c'est grâce à son cursus, n'ayant pas évolué au sein de structures hospitalières, mais plutôt dans le secteur des entreprises privées. Etant responsable de la blanchisserie, il nous a confié qu'il gère la filière comme s'il s'agissait de sa propre entreprise. Il a ajouté que : « si les rênes du pouvoir avaient été confiés à une tierce personne du secteur hospitalier public, cela aurait été forcément différent ».

La présentation de ce cas nous semble mettre en exergue les conséquences d'une animation chaotique tant pendant la phase de veille que dans la construction du projet. On peut aussi s'interroger sur les effets négatifs d'une hiérarchie trop rigide qui bloque la pratique d'une veille continue tout au long de la préparation du projet, et d'une remise en cause de certains choix. La centralisation de la communication sur des outils désormais traditionnels, documents papier et vidéo, ne semble pas efficace dans des structures qui supportent une charge d'activité intense. La faiblesse de l'animation semble alourdir la demande de formation des salariés. Cette exigence nous semble pouvoir être considérée comme l'expression d'un besoin de communication orale et interpersonnelle. Les échanges internes au sein de l'équipe en charge du projet auraient sans doute permis la diffusion de connaissances tacites et leur explicitation auprès des personnes impactées par le projet, en réduisant ainsi les coûts, et favorisant l'empowerment des salariés.

5.0 Conclusion

Comme nous l'avons indiqué au début de cette communication, la problématique de l'animation dans le cadre de la veille stratégique et du management des projets innovants a été très peu étudiée. Notre ambition, à travers cette communication, était de s'appuyer sur les conclusions de la littérature relatives à l'animation pour décrypter les pratiques d'animation observées sur les activités de veille stratégique et celle de construction d'un projet d'innovation non médicale dans des terrains hospitaliers privé et public.

Nous avons constaté, à partir de l'étude du cas « DAV / B2K », les effets d'une présence moindre d'éléments d'animation dans la pratique du management de projet, et l'absence presque complète d'une fonction de veille stratégique. Si certains de ces effets peuvent être attribués à l'attitude du chef de projet et responsable de la filière blanchisserie, la structure du processus d'innovation n'apparaît pas seulement liée à cette personnalité. L'organisation hiérarchique, les contraintes de temps, rigidifient les processus et les relations interpersonnelles, brident la créativité et sans doute encouragent la culture du silence et la rétention d'informations.

Dans le cas « assiette durable », au contraire, les deux responsables de la veille adoptent la position de « champion », définie par la littérature. Ils s'appuient sur des formes de management participatif via des réunions de proximité thématiques qui

permettent la construction du projet innovant « chemin faisant » en impliquant une grande variété de personnes aux fonctions et statuts différents. Les échanges interpersonnels qui en résultent, favorisent le décroisement des services et la circulation des connaissances tacites, voire explicites, des personnels et diminuent le sentiment d'un manque de formation. On peut même penser que ce décroisement joue un rôle important dans l'acceptation de l'innovation par tous ceux qui en sont impactés, car l'efficacité des documents écrits ou vidéos semble se réduire avec leur généralisation dans des structures productives en situation de sous effectif. Il semble que l'orientation proactive des structures de soins privées, dynamisées par le besoin de résultats financiers positifs, les rend plus sensibles aux effets bénéfiques sur la dynamique d'innovation, de la pratique de l'animation de la veille et de la gestion de projets.

Le travail doctoral sur lequel repose cette communication a permis de valider ces conclusions sur d'autres cas, mais il serait nécessaire de les confirmer par des recherches complémentaires s'appuyant sur des enquêtes plus systématiques.

6.0 Références

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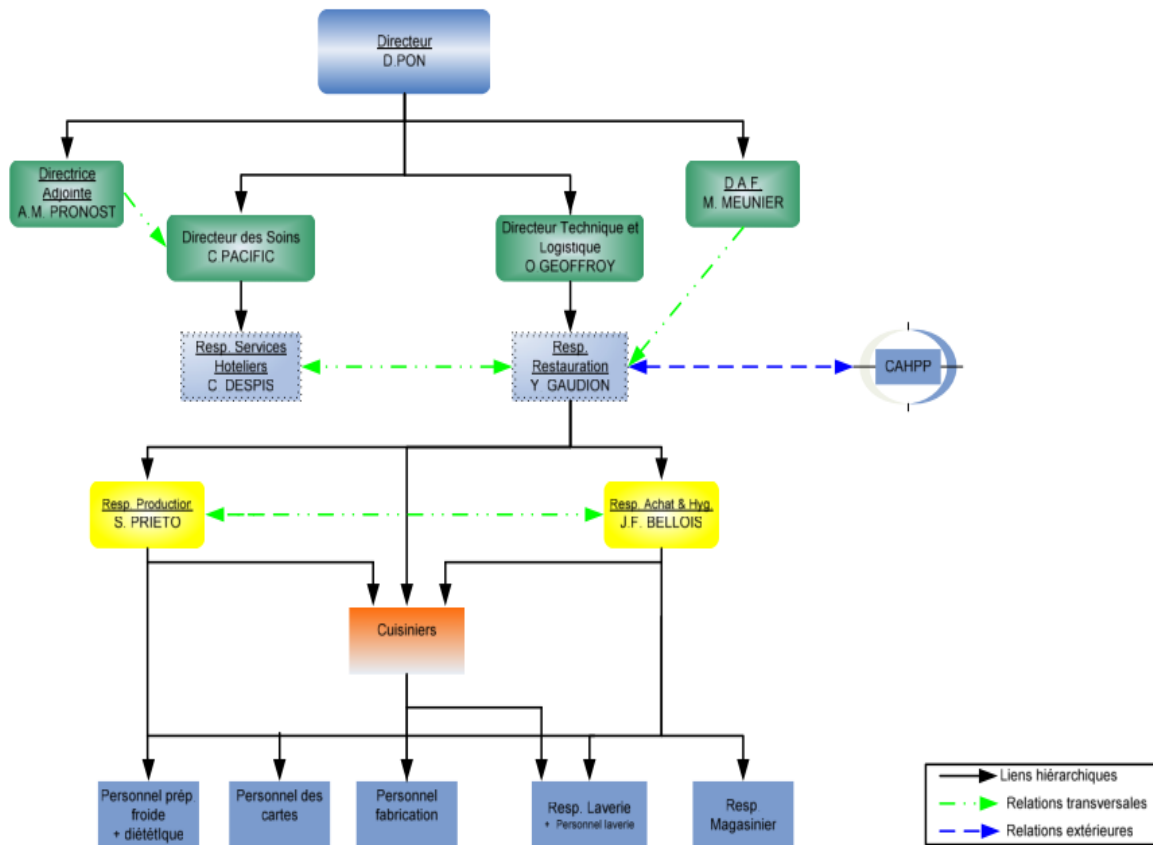
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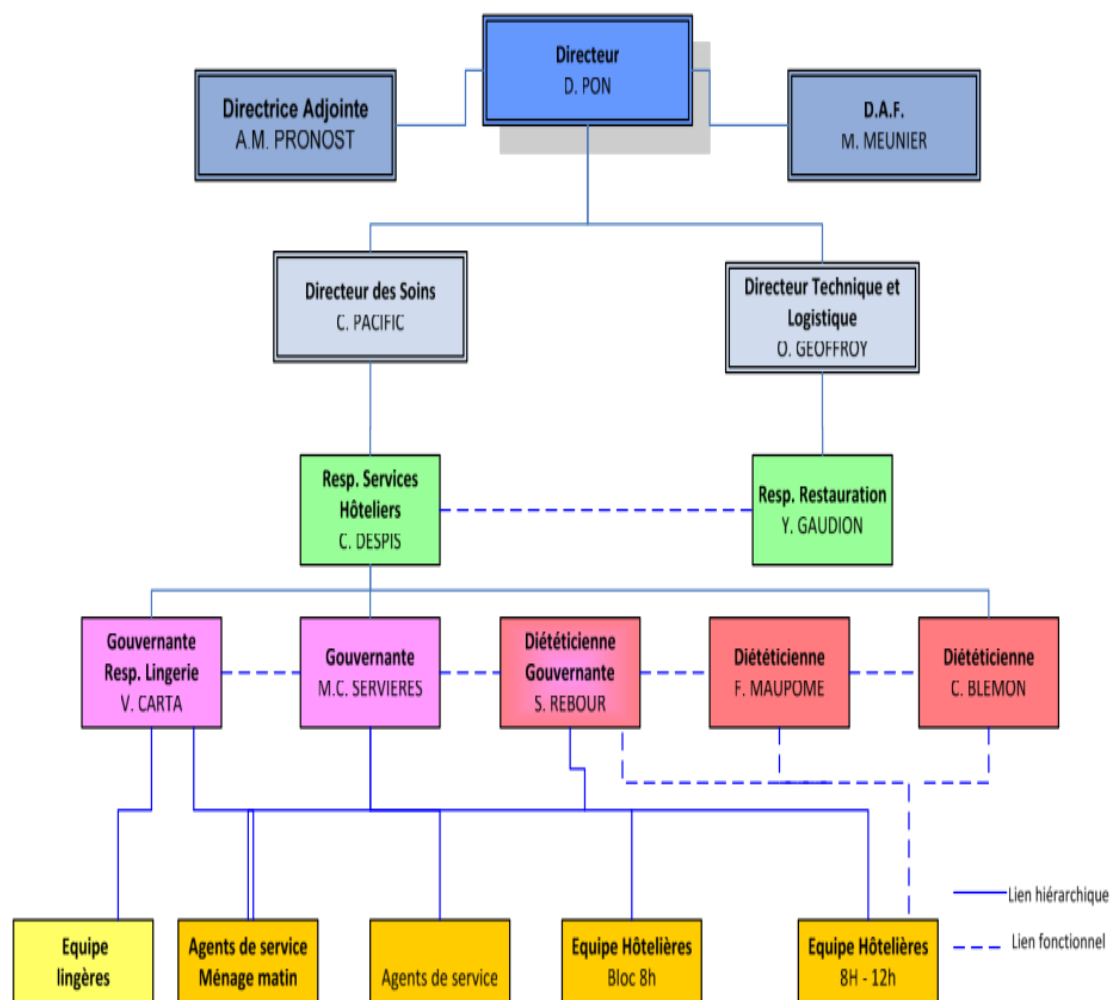
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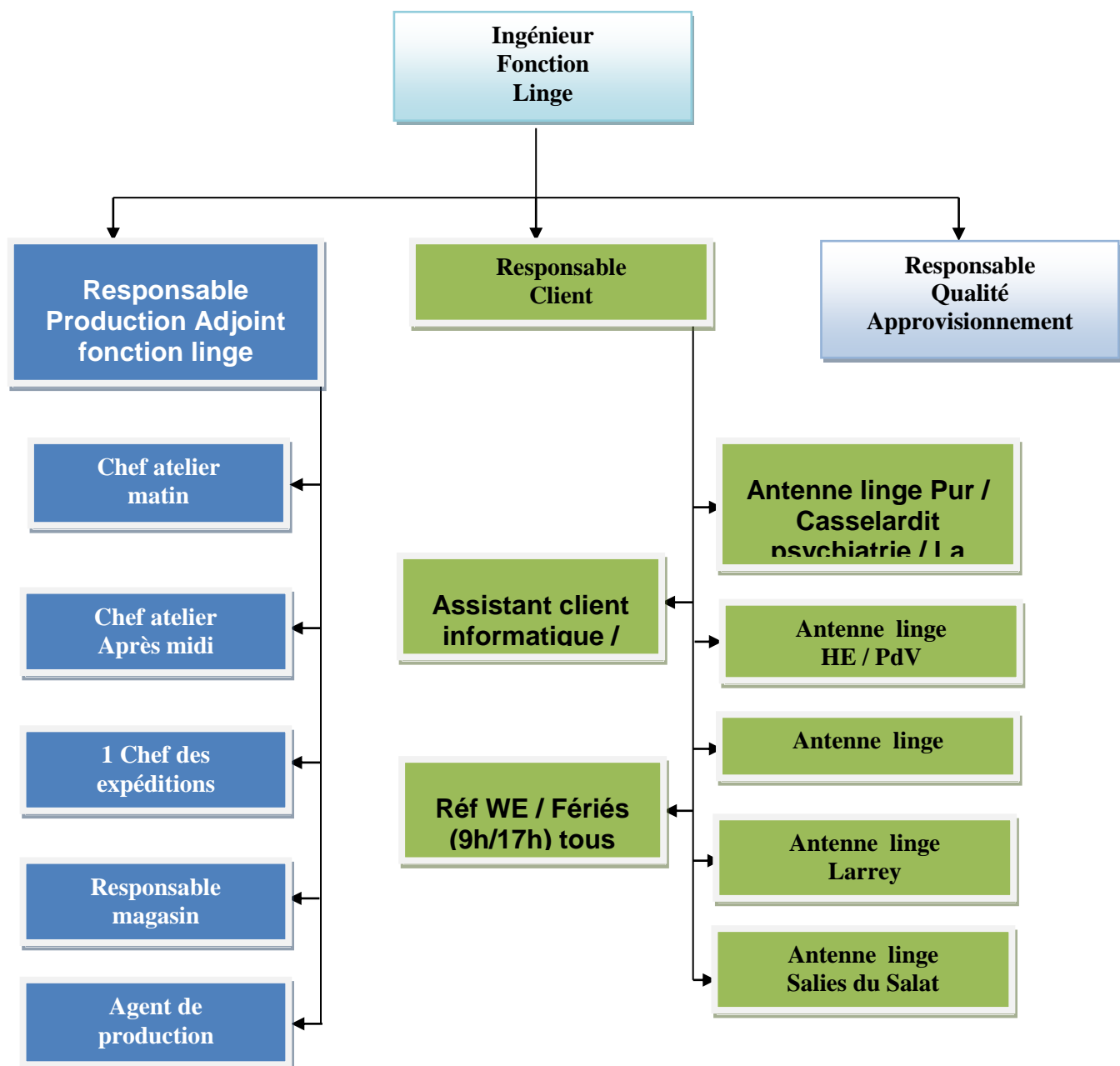
Annexe 1 : organigramme du service restauration de la clinique P.



Annexe 2 : organigramme des services hôteliers de la clinique P.



Annexe 3 : organigramme de la filière blanchisserie, HP



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Innovation management in healthcare services. Two countries in comparison

Extended Abstract

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In Finland and Germany, like in most developed countries, healthcare services are comprised of intertwined endeavours of cross-functional teams. Their innovative behaviour is carried out mostly in invisible and intangible processes instead of R&D departments. The intangible nature of innovations challenges management processes. The healthcare service innovations require context-specific means to benchmark and measure the management. This paper provides a framework for enabling a revision of the invisible innovation management process into a more tangible and measurable form.

1. Introduction

In most OECD-countries healthcare has been over thirty years both "*stirred and shaken*", quoting James Bond, the famous secret agent. Instead of slowing down, the pace of change is accelerating, and challenging management processes. The administration, clinical procedures and service provision culture have to be updated. Simultaneously, the changes promote a management style that is more aware of the factors that contribute to service innovations in the healthcare context. In order to continuously improve the multiple and complex factors of service innovations in the context, their critical drivers should be discovered, and evaluated and benchmarked. This paper provides a theoretical framework for such service innovation management measurement.

Healthcare faces major pressures that drive the practitioners to aspire service improvements in terms of efficiency, effectiveness and quality. Aging population, budget cuts, quality deficiencies, demanding patients, a shortage of personnel, and ubiquitous healthcare digitalisation, all challenge the healthcare service providers. What is more, the Internet has changed health-related behaviour and altered the information asymmetry between providers and customers; the Internet provides healthcare service users with an easy access to e.g. diseases-specific information.

Since Schumpeter's pioneering work in 1911, academic interest on innovation has grown, inspiring a growing number of fields of research, ex-

tending from sociology to management, psychology and business administration. Innovation research also covers multiple layers of analysis: individuals, groups, organizations, economies, and societies. Research on innovation prerequisites, processes, characteristics and outcomes is both vast and complex. However, the literature indicates that in order to achieve sustainable and continual performance improvement, the organisation needs to aspire and enable uninterrupted, strategy-driven development and innovation. Without a systematic measurement which enables the combination of economical and other metrics, financial and human resources will be wasted (Kaplan; Norton, 1996; Melnyk et al. 2010). The difficulty to identify and define a service innovation has biased academics and practitioners to understate the importance of innovative behaviour in services. A definition of Gallouj; Savona (2009) suggests a fruitful premise for research on innovations in services; according to the authors, service innovations are “*changes affecting one or more vectors of characteristics (both technical and service) or of competence*”. The definition clarifies Schumpeter’s original definition of innovation accordingly, innovations is a ‘*new good... or a new quality of good, new method of production or an introduction of a new production method*’. In innovation management, according to Ortt and Duin (2008), it is possible to identify four generations wherein an era and contexts differ. The first generation was R&D laboratory-related, the second implemented project management methods to R&D, the third tried to reinforce co-operation in cross-functional teams, and the fourth tried to incorporate stakeholders to innovation process. They disagree with some authors, such as Miller (2001), and Niosi (1991), who promote an idea of a fifth generation, and promote an idea of *contextual innovation management* that capitalises the context specific traits and their adaption to new surroundings.

This paper attains to fill a knowledge gap in the service innovation management literature so as to service innovation management evaluation, and to a need of practitioners to benchmark a service innovation management process. To meet the need, we provide a service management measurement (SIM) model. This builds on previous research in technology- and product-related innovation management and service innovation management research. The theoretical framework draws from several sources of management science: service innovation literature, strategy-related literature, the resource-based view (RBV) that brings forward the essential success factors, e.g. organisation-related particular skills, knowledge and other assets (e.g. Penrose, 1959 and Rumelt, 1984), and efficiency-based approach that emphasises capitalisation ability of internal and external prospects (e.g. Teece et al. 1997).

2. Literature review

The innovation management measuring focuses mainly on manufacturing, or more precisely on a product and technology-based innovation management, which differs from service innovations management (Cooper, 1993; Kleysen; Street, 2001). In the recent literature review on innovation management measurement, Adams et al. (2008) indicate how a mul-

tifaceted product management process includes seven main categories: 1) *inputs* that means tangible resources, human resources and tools, 2) *knowledge management* aspect emphasis idea generation, knowledge repository, and informal and formal information flows, 3) *innovation strategy* that highlights orientation and leadership in terms of innovation, 4) *organization culture* includes 'atmosphere' and structure, 5) portfolio management tries to balance risks and returns, 6) *project management* includes efficiency, tools, communication and co-operation and 7) *commercialization* is based on market research, testing and marketing.

An organisation's strategy can be seen as a manifestation of its goals and the way it carries out value in context (Eisenhardt, 1997). In his influential work on strategy Rumelt (1980) suggests four aspects to be looked at: *consistency, consonance, advantage, and feasibility*. Here *consistency* refers to the organisation's ability to incorporate its objectives, policies and plan of actions, *consonance* to legitimacy of the whole field of operation, *advantage* to competitive position and *feasibility* to resources at hand, both financial and other. The definition of the core competencies of the organisation is critical. However, certain flexibility and openness to changes have to be preserved (Mintzberg, 1994).

Organisational culture reflects a decision making criterion that is seen desirable or punishable in a certain context. Therefore, culture serves as a mediator between change management and innovative performance (Amabile, 1998). The leadership style is an essential element that can either induce or inhibit the generation of ideas and resulting potential innovations. As an example of the former we could mention the transformational leadership, which refers to a leadership style wherein innovative behaviour is reinforced and rewarded (Bass; Avolio, 1994. Gardner; Avolio, 1998)

Tuominen and Toivonen (2007) as well as Sundbo contribute to service innovation management research. According to them, '*organization atmosphere*' in services has a prominent role in detecting latent needs and innovative solutions In their view, *innovativeness* refers to an organizations' capability to generate innovations, embed innovations in organization or adopt an innovation that has been created in other organisations, whereas research on *creativity* focuses on individual and group-related traits such as personality and cognitive characteristics and organisation size, working models and process. Although 'atmosphere' affects work motivation in every industry, the management's role as an enabler or a barrier of innovative behaviour can be more crucial in services than in the manufacturing industry since the user interface is an essential source of innovations in services.

Sundbo (1996) draws from the contradiction of management's role which on one hand boost employees' idea generation, but on the other hand directs ideas according to strategy to improve the realisation of ideas. His concept of a '*balanced empowerment*' reviews the dual system in every organisation: there is an informal interaction structure among personnel on one hand, and on the other hand a formal management structure with

expressed official goals, norms and values. Sundbo suggests that the management should find a balance wherein the personnel's experiences with customers are harnessed for the sake of innovation generation, but in the framework of organization's goals. Sundbo builds on dynamic capabilities framework (Teece, 2007) that reviews how organisations adapt to changing surroundings, and how actively and proactively the organisation tries to shape an environment towards a desired direction.

Cormican and O'Sullivan (2004) suggest that cross-functional teams create preconditions for product innovation and make it possible to improve the utilisation of multiple but differing skills and competencies. Mixed backgrounds in terms of education, sex and age support innovative behaviour (Bantel; Jackson, 1989) and role diversity is a prerequisite to promote innovative projects. The management structure, the ability to perform and the capability to generate innovations are inter-related; organic and egalitarian management structures enhance an inclination to idea generation without an anxiety of failure.

Allen proposed a somewhat confusing term, a *technological gatekeeper*, for persons who are able to construct bridges with members of external professional knowledge. A technological gatekeeper is a community member who has connection to external sources of information and who is able to benefit their community with the newest information (Tushman, 1988). In the service innovation literature the role of a customer or a user is often emphasized (e.g. Vargo; Lusch, 2008) but knowledge intensive businesses have also an essential role as source of innovation (Hertog, 2000).

This conference paper discusses healthcare service innovations management measurement on the bases of literature. We review the challenges applying existing indicators in the healthcare context. In the following section we will briefly highlight the methods, and discuss the research process.

3. Method: Converting the insights in the literature into an empirical survey

The measurement builds on existent literature on both technological and service innovation management, management measurement and current challenges in the healthcare development.

After having discussed the theoretical aspects of the management of innovation in a complex organisation like a hospital, we aim at using them for an empirical survey in Finland and Germany. With the assistance of an advisory board we have pre-tested the measurement instrument.

We started by using the PIM-scorecard published in Cormican/O'Sullivan (2004) developed for "auditing best practice for effective product innovation management". As some of the questions therein appeared to us to be difficult to use in a questionnaire, we made a pre-test. The pre-test consisted in face-to-face conversations about the draft of the questionnaire with hospital managers, our target group.

The main problems in the PIM-scorecard seemed to be based in the design of it which was more a tool of soul-searching by managers alone for themselves than a classical questionnaire. They mainly appeared in questions which were formulated in a fashion that managers in-charge cannot answer in another way than by: "I fully agree!" Examples of such questions which might make sense in self-auditing but not in asking another person are:

"All processes are lead by customer-needs."

"The managers utilize and develop specialized knowledge" and

"The communication skills are an essential part of professional knowledge."

The consequence of these difficulties which were not expected beforehand is that the survey has not yet been submitted to the field.

4. Conversation

The authors would like to hear in the session from our colleagues what could be done otherwise to overcome the problems.

The awareness of the need of service innovations is awakening but the practitioners as well as the academics still need the discussion on how to improve the innovative process in order to gain results that can improve efficiency and quality of the contemporary service economy in many OECD countries.

As we have said above we will empirically test this measurement and report about results in the next Reser-Conference. We welcome new partners and hope that the comparative research on the topic will provide valuable knowledge in terms of service innovation management in healthcare in each and every partner country.

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contributions!



